Specialist Medical Review Council

Reasons for Decisions

Section 196W
Veterans' Entitlements Act 1986

Re: Statements of Principles Nos. 41 and 42 of 2008
In Respect of Haemorrhoids
Matter Nos. 2006/3 & 4
Requests for Review Declaration No. 14

SUMMATION

1. In relation to the Repatriation Medical Authority (the RMA) Statement of Principles No. 41 of 2008 in respect of haemorrhoids and death from haemorrhoids, made under subsection 196B(2) of the *Veterans' Entitlements Act 1986* (the VEA), the Specialist Medical Review Council (the Council) under section 196W of the VEA:

DECLARES that the sound medical-scientific evidence available to the RMA is insufficient to justify an amendment to include as a factor(s) exposure to:

the 'effect of high 'G' forces;' and/or

the 'effect of the anti 'G' straining manoeuvre;'

or any other factor;

RECOMMENDS that the RMA:

a) carry out a new investigation to find out whether there is sound medical-scientific evidence to justify including exposure to:

the 'effect of high 'G' forces;' and/or

the 'effect of the anti 'G' straining manoeuvre;'

as a factor or factors in Statement of Principles No. 41 of 2008; and

b) for the purposes of the investigation, ask the Secretary of the Department of Veterans' Affairs (DVA) under section 196C(2) of the VEA to:

- carry out research (including any test or experiment) to obtain, confirm, or disprove, specific information about the prevalence of haemorrhoids in the cohort of RAAF fighter jet pilots and any potential association with:

  the 'effect of high 'G' forces;' and/or

  the 'effect of the anti 'G' straining manoeuvre;' and

- to forward a report to the RMA.

2. In relation to the RMA Statement of Principles No. 42 of 2008 in respect of haemorrhoids and death from haemorrhoids, made under subsection 196B(3) of the VEA the Council under section 196W of the VEA:

DECLARES that it is of the view that the sound medical-scientific evidence available to the RMA is insufficient to justify an amendment to include as factors any or all of exposure to:

'the effect of high 'G' forces;'

'effect of the anti 'G' straining manoeuvre;'

or any other factor; and

RECOMMENDS that the RMA:

a) carry out a new investigation to find out whether there is sound medical-scientific evidence to justify including exposure to:

the 'effect of high 'G' forces;' and/or

the 'effect of the anti 'G' straining manoeuvre;'

as a factor or factors in Statement of Principles No. 42 of 2008; and

b) for the purposes of the investigation, ask the Secretary of the Department of Veterans' Affairs (DVA) under section 196C(2) of the VEA to:

- carry out research (including any test or experiment) to obtain, confirm, or disprove, specific information about the prevalence of haemorrhoids in the cohort of RAAF fighter jet pilots and any potential association with:

  the 'effect of high 'G' forces;' and/or

  the 'effect of the anti 'G' straining manoeuvre;' and

- to forward a report to the RMA.

THE SPECIALIST MEDICAL REVIEW COUNCIL

3. The Council is a body corporate established under section 196V of the VEA, and consists of such number of members as the Minister for Veterans' Affairs determines from time to time to be necessary for the proper exercise of the function of the Council as set out in the VEA. The Minister must appoint one of the Councillors to be the Convener.

4. When a review is undertaken the Council is constituted by 3 to 5 Councillors selected by the Convener. When appointing Councillors, the Minister is required to have regard to the branches of medical science expertise which would be necessary for deciding matters referred to the Council for review.

5. Clinical Associate Professor Jonathan Phillips FRANZCP was the Convener of the Council for this review. He is currently a consultant in private practice, and a past Chairperson of the Committee of Presidents of Medical Colleges. The other members of the Council were:

   (i) Dr Charles Guest FAFPHM, Chief Health Officer in the Australian Capital Territory, Executive Director of the Population Health and Research Division at ACT Health and Adjunct Professor at the Australian National University Medical School; and

   (ii) Mr Michael Levitt FRACS, a consulting colorectal surgeon in private practice and Director of Medical Services at St John of God Hospital in Subiaco in Western Australia; and

   (iii) Dr David Newman ASAsM AsMA, Managing Director of Flight Medicine Systems, Head of the Aviation Medicine Unit in the Department of Epidemiology and Preventative Medicine at Monash University, Victoria, and Head of Research in the Aviation Discipline, Faculty of Engineering and Industrial Sciences, Swinburne University, Victoria.

THE LEGISLATION

6. The legislative scheme for the making of Statements of Principles is set out in Parts XIA and XIB of the VEA. Statements of Principles operate as templates which are ultimately applied by decision-makers in determining individual claims for benefits under the VEA and the *Military Rehabilitation and Compensation Act 2004* (the MRCA).[1]

7. Fundamental to Statements of Principles is the concept of 'sound medical-scientific evidence', which is defined in section 5AB(2) of the VEA. Information about a particular kind of injury, disease or death is taken to be sound medical-scientific evidence if:

---

[1] See sections 120, 120A and 120B of the VEA and sections 335, 338 and 339 of the MRCA.

a) the information:

(i) is consistent with material relating to medical-science that has been published in a medical or scientific publication and has been, in the opinion of the Repatriation Medical Authority, subjected to a peer review process; or

(ii) in accordance with generally accepted medical practice, would serve as the basis for the diagnosis and management of a medical condition; and

b) in the case of information about how that injury, disease or death may be caused meets the applicable criteria for assessing causation currently applied in the field of epidemiology. [2]

8. The functions of the Council are set out in section 196W of the VEA. In this case, the Council was asked (under section 196Y of the VEA) by a person eligible to make a claim for a pension, to review the contents of:

- Statement of Principles No. 41 of 2008, in respect of haemorrhoids and death from haemorrhoids, being a Statement of Principles determined by the RMA under section 196B(2) [3] of the VEA ('the reasonable hypothesis test'); and
- Statement of Principles No. 42 of 2008, in respect of haemorrhoids and death from haemorrhoids, being a Statement of Principles determined by the RMA

---

[2] This has been held to mean 'information which epidemiologists would consider appropriate to take into account' see *Repatriation Commission v Vietnam Veterans' Association of Australia NSW Branch Inc* (2000) 48 NSWLR 548 (the New South Wales Court of Appeal decision) per Spigelman CJ at [117].

[3] Section 196B(2) provides:

If the Authority is of the view that there is sound medical-scientific evidence that indicates that a particular kind of injury, disease or death can be related to:

(a) operational service rendered by veterans; or

(b) peacekeeping service rendered by members of Peacekeeping Forces; or

(c) hazardous service rendered by members of the Forces; or

(ca) warlike or non-warlike service rendered by members;

the Authority must determine a Statement of Principles in respect of that kind of injury, disease or death setting out:

(d) the factors that must as a minimum exist; and

(e) which of those factors must be related to service rendered by a person;

before it can be said that a reasonable hypothesis has been raised connecting an injury, disease or death of that kind with the circumstances of that service.

under section 196B(3) [4] of the VEA ('the balance of probabilities test').

9. Specifically, the Applicant contended that there was sound medical-scientific evidence upon which the RMA could have relied to include as a factor or factors in Statements of Principles Nos. 41 and 42 of 2008 exposure to 'the effect of high 'G' forces' and/or 'effect of the anti 'G' straining manoeuvre'.

10. In conducting its review, the Council must review all the information that was available to (before) the RMA at the time it determined, amended, or last amended the Statements of Principles, and is constrained to conduct its review by reference to that information only. [5]

11. Under section 196W of the VEA, the Council can only reach the view that a Statement of Principles should be amended on the basis of sound medical-scientific evidence.

BACKGROUND

The terminated review

12. On 7 October 2004, the RMA under subsections 196B(2) and (3) of the VEA determined Statements of Principles Nos. 26 and 27 of 2004 in respect of haemorrhoids (the 2004 SoPs).

13. On 16 November 2004 in accordance with section 42 of the *Legislative Instruments Act 2003* the 2004 SoPs were tabled in the House of Representatives and in the Senate.

14. An Application dated 15 November 2004 for review of the 2004 SoPs was received by the Council. The Application was concerned, specifically, with the decision of the RMA of 7 October 2004 not to include as a factor or factors in the 2004 SoPs exposure to 'the effect of high 'G' forces' and/or 'effect of the anti 'G' straining manoeuvre'.

---

[4] Section 196B(3) provides:

If the Authority is of the view that on the sound medical-scientific evidence available it is more probable than not that a particular kind of injury, disease or death can be related to:

(a) eligible war service (other than operational service) rendered by veterans; or

(b) defence service (other than hazardous service) rendered by members of the Forces; or

(ba) peacetime service rendered by members;

the Authority must determine a Statement of Principles in respect of that kind of injury, disease or death setting out:

(c) the factors that must exist; and

(d) which of those factors must be related to service rendered by a person;

before it can be said that, on the balance of probabilities, an injury, disease or death of that kind is connected with the circumstances of that service.

[5] *Vietnam Veterans' Association (NSW Branch) Inc v Specialist Medical Review Council and Anor* (full Federal Court decision) (2002) 72 ALD 378 at [35] per Branson J.

15. Pursuant to section 196ZB of the VEA the Council published in the Gazette a Notice of its Intention to Carry out a Review of all the information available to the RMA about haemorrhoids, and inviting persons or organisations authorised so to do to make submissions to the Council. [6] The Council gazetted two subsequent notices as to the dates by which written submissions must be received by the Council. [7]

Review of the new SoPs

16. On 27 June 2008 the RMA advised the Council that on 19 June 2008 the RMA under subsections 196B(2) and (3) of the VEA had revoked the 2004 SoPs, and had replaced them with Statements of Principles Nos. 41 and 42 of 2008 in respect of haemorrhoids.

17. On 30 July 2008 the Council wrote to the Applicant relevantly advising that:

    17.1. the RMA had revoked the 2004 SoPs (the revoked SoPs) and had determined new Statements of Principles Nos. 41 and 42 of 2008 (the new SoPs) in respect of haemorrhoids;

    17.2. the Council had thus lost its jurisdiction (was unable) to continue with its review of the revoked SoPs; [8] and

    17.3. if the new SoPs did not address his concerns, he may ask the Council to review the contents of the new SoPs, by making an application in accordance with the VEA.

18. On 30 July 2008 the Council wrote in relevantly similar terms to the Repatriation Commission (the Commission) and the Military Rehabilitation Commission, [9] and to a person, other than the Applicant, who had made a submission to the Council in its review of the revoked SoPs.

19. On 26 August 2008 in accordance with section 42 of the *Legislative Instruments Act 2003* the new SoPs were tabled in the House of Representatives and in the Senate.

20. Pursuant to section 196ZB of the VEA the Council published in the Gazette a Notice of Revocation of Intention to carry out a review, and a Notification of the Termination of the Review of the revoked SoPs. [10]

---

6 Gazette number 15 of 20 April 2005 (p. 927).

7 Gazette Notice 25 of 29 June 2005 (p. 1445), and Gazette Notice 45 of 16 November 2005 (p. 2761).

8 See the full Federal Court decision.

9 Only the Rehabilitation Commission took an active role in the review of the new SoPs.

10 Gazette number 32 of 13 August 2008, (p. 2192).

21. An Application dated 8 September 2008 for review of the new SoPs [11] was received by the Council. Specifically, the Application was concerned with the decision of the RMA of 19 June 2008 not to include as a factor or factors in the new SoPs exposure to 'the effect of high 'G' forces' and/or 'effect of the anti 'G' straining manoeuvre'.

22. Pursuant to section 196ZB of the VEA the Council published in the Gazette a Notice of its Intention to Carry out a Review of all the information available to the RMA about haemorrhoids, and inviting persons or organisations authorised so to do to make submissions to the Council.[12] The Council gazetted one subsequent notice as to the date by which written submissions must be received by the Council. [13]

23. On 21 May 2009 the Council wrote to the Applicant advising that:

    23.1. the Council in its (terminated) review of the revoked SoPs (the previous Review Council) had not made any preliminary or final decisions on any of the contended factors, nor had it made any preliminary or final decisions about either the proposed scope of review, or the proposed pool of information;

    23.2. the Convener's preliminary view was that no question of prejudgement or apprehension of bias arose;

    23.3. all of the Councillors comprising the previous Review Council were pre-eminent experts in their respective fields;

    23.4. the Convener's preliminary view was that the selection of the same Councillors for the Review Council to review the new SoPs (the new Review Council), as had been selected to the previous Review Council, would enable the review of the new SoPs to be undertaken in the most cost-effective and expeditious way possible; and

    23.5. that the Applicant had an opportunity to comment on the Convener's proposed decision on the constitution of the new Review Council before the Convener made a final decision.

24. On 21 May 2009 the Council similarly wrote to the Commission, providing the Commission with an opportunity to comment on the Convener's preliminary view on the constitution of the new Review Council.

25. On 12 August 2009 the Council wrote to the Applicant and the Commission advising that:

---

11 For an abundance of clarity, the new SoPs being Statements of Principles Nos. 41 and 42 of 2008 in respect of haemorrhoids.

12 Gazette number 42 of 22 October 2008, (p. 2649).

13 Gazette Notice 30 of 5 August 2009, (p. 1959).

25.1. no comment on the proposed constitution of the new Review Council had been received from the Applicant, the Commission, nor any other eligible person or organisation;

25.2. the Convener's final decision was to constitute the new Review Council with the Councillors who had constituted the previous Review Council;

25.3. the information before the new Review Council would comprise:

(a) the information available to the RMA when it determined the revoked SoPs; and

(b) the additional information which was available to the RMA when it determined the new SoPs; and

25.4. the new Review Council would make preliminary decisions on the proposed scope of review and proposed pool of information; and

25.5. the Applicant, the Commission, and any other eligible persons and organisations who made submissions to the new Review Council would be provided with an opportunity to comment on those preliminary decisions.

The information sent by the RMA to the Council

26. By letter dated 13 January 2005 the RMA, under section 196K of the VEA, sent to the Council the information the RMA advised was available to (before) it at the relevant times, in respect of the revoked SoPs (the 2004 information).

27. By letters dated 8 July 2005, the previous Review Council sent to each of the Applicant and the Commission a copy of the 2004 information sent by the RMA to the Council.

28. By letter dated 25 October 2006 and e-mail dated 27 October 2006 the RMA:

28.1. sent to the Council further information which the RMA advised was available to (before) it at the relevant times, in respect of the revoked SoPs (the 2006 information); and

28.2. at the Council's request clarified that a paper referred to in a submission to the RMA [14] was not available to (not before) it (the RMA) at the relevant times, and so was new information. [15]

---

[14] Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, 'Symptomatologie Hemorroidaire et Pilotes de Chasse,' *Medecine Aeronautique et Spatiale,* tome XXII, pp. 328-332.

[15] See **Appendices D, F and G.**

29. By letter dated 19 September 2007, the RMA confirmed to the Council the information which the RMA advised was available to (before) it at the relevant times, in respect of the revoked SoPs. [16]

30. By letter dated 19 December 2008, the RMA, under section 196K of the VEA, sent to the Council a list setting out the information the RMA advised was available to (before) it at the relevant times in respect of the new SoPs (the 2008 information). [17]

31. The RMA confirmed that the 2004 information and the 2006 information was available to it when it determined the new SoPs, and asked that the Council use the 2004 information and the 2006 information which it (the Council) already held from its (terminated) review of the revoked SoPs. The RMA sent copies of the 2008 information.[18]

32. On 21 May 2009 the new Review Council wrote to the Applicant:

    32.1. advising that the information for the review of the new SoPs comprised the:

        (a) 2004 information

        (b) 2006 information; and

        (c) 2008 information; and

    32.2. confirming that the letters and written submissions listed below, which had been made by the Applicant to the previous Review Council, would be taken into account as submissions to the new Review Council:

        (a) Letter of 12 August 2003 to DVA;

        (b) Letter of 5 November 2004 to the RMA;

        (c) Application to the previous Review Council of 15 November 2004; and

        (d) Letter of 25 July 2005 to the previous Review Council.

33. On 21 May 2009 the new Review Council similarly wrote to the Commission, confirming the information before the new Review Council (as set out above), and acknowledging

---

16 See **Appendix B.**

On the basis of the list of the information which the RMA advised was available to it at the relevant times, the Council also identified the new information listed in **Appendix G**.

17 See **Appendix B**.

18 The RMA re-sent copies of submissions that were contained within the 2004 information.

that the Commission's August 2005 written submission, made to the previous Review Council, would be taken into account as a submission made to the new Review Council.

34. By correspondence dated 5 October 2009 and 6 October 2009 respectively, the new Review Council sent to each of the Applicant and the Commission a copy of the 2006 information and the 2008 information.

Notification of Preliminary Decisions on Proposed Scope of Review and Proposed Pool of Information

35. In separate letters each dated 10 December 2009, to each of the Applicant and the Commission respectively, the new Review Council in summary:

35.1. advised of the new Review Council's preliminary decisions on the proposed scope of the review and proposed pool of information;

35.2. invited the Applicant and Commission to make any written comments as to the new Review Council's preliminary decisions by close of business on 29 January 2010;

35.3. advised that if any written comments were made, any complementary oral comments could be made at any hearing of oral submissions complementing the written submissions;

35.4. advised that the Applicant's oral submission to the previous Review Council on 8 December 2006, complementing his written submissions (as set out in [32.2]), would be taken into account by the new Review Council;

35.5. advised that the Commission's oral submission to the previous Review Council on 31 October 2006, complementing the Commission's written submission (as set out in [33 above]), would be taken into account by the new Review Council; [19]

35.6. advised that:

(a) the new Review Council had received no written submissions (from either the Applicant or the Commission) subsequent to the oral submissions complementing the written submissions made before the previous Review Council (which written submissions, as mentioned above, were taken to be submissions to the new Review Council) and;

---

[19] Copies of the transcripts of the Applicant's and the Commission's respective oral submissions to the previous Review Council, complementing their respective written submissions, were forwarded to the Applicant and to the Commission's representative. A further copy was sent to each of the Applicant and the Commission under cover of one of the letters of 10 December 2009.

(b) in the new Review Council's preliminary view, if no comments were made on the proposed scope of review, and proposed pool of information decisions, no purpose would be served by affording the Applicant and the Commission an opportunity to make a further oral submission complementing their respective written submissions;

35.7. invited the Applicant and the Commission to make any written comments concerning the new Review Council's preliminary view by close of business on 15 January 2010; and

35.8. advised that if no comments were received, the new Review Council would proceed on the basis that the Applicant and the Commission did not wish to make any further oral submissions complementing their respective written submissions.

36. The new Review Council did not receive any comments from the Applicant or the Commission on the new Review Council's preliminary views on any of:

36.1. the proposed scope of the review;

36.2. the proposed pool of information; and

36.3. the new Review Council proceeding on the basis that neither the Applicant nor the Commission wished to make any further oral submissions, complementing their respective written submissions.

37. The new Review Council held a meeting on Friday 19 February 2010 to consider all written submissions and complementary oral submissions.

PROPOSED SCOPE OF REVIEW

38. The new Review Council's preliminary decision on the scope of the review, as advised to the Applicant and the Commission on 10 December 2009 was as follows:

> without limiting the scope of its review of some or the whole of the contents of the [new SoPs, the new Review Council] presently proposes to have particular regard to whether there is sound medical-scientific evidence upon which the RMA could have relied to amend the [new SoPs] in any or all of the following ways:
>
> (i) the possible inclusion of a factor or factors as contended for 'Effect of high 'G' Forces' and/or 'Effect of the anti 'G' straining manoeuvre'…; and
>
> (ii) the possible excision or amendment of the factor in Statement of Principles Number 41 of 2008 referred to in paragraph 6(d)…namely 'being obese at the time of the clinical onset of haemorrhoids'; and

(iii) the possible excision or amendment of the factor in Statement of Principles Number 41 of 2008 referred to in paragraph 6(h)…namely 'being obese at the time of the clinical worsening of haemorrhoids'.

PROPOSED POOL OF INFORMATION

39. As mentioned above, the RMA is obliged under section 196K of the VEA to send to the Council all the information that was available to it (the RMA) when it determined, amended, or last amended the new SoPs. That comprises all the information that was available to the RMA when it determined the original Statements of Principles in 1994, and all the information subsequently available at all times when the Statements of Principles have been amended, or revoked and replaced, up to and including the information which was available in June 2008 when the RMA determined the new SoPs. In other words, within 28 days after being notified that the Council has been asked to conduct a review, the RMA must send to the Council all the information in respect of haemorrhoids which was in the possession of the RMA at the time it (the RMA) made the decision that triggered the Council's review.

40. The chronology of the RMA sending the information to the Council in respect of the previous Review Council's (terminated) review of the revoked SoPs, and the new Review Council's review of the new SoPs, is detailed in [26] to [34] above. As mentioned above, copies of all the information which was available to the RMA when it determined the new SoPs, comprising the 2004 information, the 2006 information and the 2008 information, were made available to the Applicant and the Commission for the purposes of the review of the new SoPs.

41. In determining its preliminary view on the proposed pool of information, the new Review Council applied the methodology it had advised to the Applicant and the Commission on 10 December 2009: ie that the proposed pool of information should comprise the information:

41.1. that was available to (before) the RMA at the relevant times;

41.2. which was sent by the RMA to the Council at any and all times under section 196K of the VEA (being the 2004 information and the 2006 information sent by the RMA to the previous Review Council, and the 2008 information sent by the RMA to the new Review Council); and

41.3. which was considered by the new Review Council to be sound medical-scientific evidence as defined in section 5AB(2) of the VEA being information which:

(a) epidemiologists would consider appropriate to take into account; and

(b) in the new Review Council's view, 'touches on' (is relevant to):

(i) ‘Effect of high ‘G’ Forces’ and ‘Effect of the anti ‘G’ straining manoeuvre;’ and

(ii) 'being obese at the time of the clinical onset or clinical worsening of haemorrhoids'

which has been evaluated by the new Review Council according to epidemiological criteria, including the Bradford Hill criteria. [20]

42. Information which the RMA advised was not available to (not before) the RMA at the relevant times was not taken into account by the new Review Council for the purposes of the review of the new SoPs, as it could only be considered as ‘new information’, see **Appendices D, F and G**.

43. A copy of the preliminary list of the proposed pool of information was forwarded to the Applicant and the Commission, and is attached at **Appendix A.**

APPLICANT’S SUBMISSIONS

44. As mentioned above, the Applicant made:

44.1. a number of comprehensive written submissions, all of which were taken into account by the new Review Council. These comprised the following written submissions:

(a) Letter of 12 August 2003;

(b) Letter of 5 November 2004;

(c) Applications of 15 November 2004 and 8 September 2008; and

(d) Letter of 25 July 2005; and

44.2. a comprehensive oral submission complementing his written submissions. [21]

45. In his Application of 8 September 2008 (based on that of 15 November 2004 to the previous Review Council), the Applicant stated that his grounds for review were as follows:

> Aircrew flying high performance (Jet) aircraft when subjected to high ‘G’ forces encountered in flight manoeuvres (Combat Fighter Flying) exert high stomach and anal pressures to

---

20 See Bradford Hill, A (1965) ‘The Environment and Disease: Association or Causation?’ *Proceedings of the Royal Society of Medicine* Section of Occupational Medicine, Meeting January 14, pp. 295 to 300.

21 The discussion of the Applicant's submissions set out in these Reasons is derived from the written submissions and the complementary oral submission here identified.

augment the protection of the Anti-'G' suit. These pressures often result in fighter pilots (usually) suffering haemorrhoids as a result.

46. In summary, the Applicant's primary submission was that there was sound medical-scientific evidence upon which the RMA could have relied to have included as factor(s) in the new SoPs, 'Effect of high 'G' Forces' and/or 'Effect of the anti 'G' straining manoeuvre:' [22]

> My assertion regarding 'G' forces is …. the straining of the stomach and the bowel areas of the body when attempting to combat the physiological effects of those 'G' forces (Letter dated 5 November 2004).
>
> The protective "G" suit is designed to restrict blood pooling in the legs and to provide pressure to the stomach area. When 'pulling' high "G" you augment the "G" suit pressure by contracting and squeezing the stomach muscles and tightening and squeezing the area of the rectum and anus. Quite often one discharges the bowel movement during these manoeuvres (Letter dated 5 November 2004).
>
> [This is] similar to high levels of straining at the stool … this places extreme pressure on the area of the rectum (Letter dated 12 August 2003).

47. In support of his submissions, the Applicant relied upon passages he identified from a number of articles. These articles were available to (before) the RMA, and were

---

[22] The Applicant in his comments of 2 August 2010 referred to documents within RMA reference 1.9 (**Appendix B**).

These relate to a decision made in respect of different legislation, ie a 1993 workers' compensation claim made pursuant to the *Safety, Rehabilitation and Compensation Act 1988* (the precursor to the MRCA), and the papers and decision predate the Statements of Principles regime.

The Applicant: *'submitted that the information … (especially that of the then Director General of Air Force Health) should be paramount evidence that subject SOP be suitably amended as requested.'*

The comments by the then Director General of Air Force Health to which the Applicant referred were contained in a document dated July 1990, in which the then Director General of Air Force Health stated that:

> In [his] experience haemorrhoids are more common in fighter pilots than other pilots, and in the general airforce male population of about the same age. They are particularly prone to prolapse and or bleed after stressful flying operations.
>
> My hypothesis has always been that positive Gz G forces over 2 to 3G sustained for some seconds are an aetiological factor; acute exacerbation settles on restriction from such exposure.

The new Review Council considered that these comments were consistent with, and indicative of, a commonly held belief among aviation clinicians that haemorrhoids are prevalent among fighter pilots (see [150]), and were supportive of biological plausibility (see [144] - [155]).

However, the new Review Council considered that the comments did not constitute sound medical-scientific evidence. They were opinion, in circumstances where the then Director General of Air Force Health had stated that:

> to my knowledge, no definitive epidemiological study has been conducted to prove or disprove my hypothesis.

contended by the Applicant to be sound medical-scientific evidence, sufficient to justify amendment of the new SoPs to include the factor/s for which he contended.

48. The Applicant highlighted particular passages [23] from the following articles within the pool (**Appendix A**):

48.1. Glaister, DH 1988 - RMA ID 0396; [24]

48.2. DeHart, RL ed. 1985 – RMA ID 0397; [25]

48.3. Burton, RR et al 1974 – RMA ID 8889; [26] and

48.4. DeHart, R L ed. 1996 – RMA ID 14345; [27]

and made submissions as follows:

> …all indicate lower body blood pooling associated with higher G forces (Applicant letter dated 25 July 2005); and;
>
> …that flying appears to be particularly associated with hemorrhoids. Authors in DeHart, R L 1985, at p. 577 and 1996, at p. 649;
>
> DeHart writes: 'it also appears possible that G forces appear to aggravate the tendency toward this condition.' 1985, at p. 577 and 1996, at p. 649;

48.5. Burkitt, D P 1975 - RMA ID 18134: [28]

> …shows that abdominal straining forces exert an increased pressure within the superior hemorrhoidal veins (at pp. 486-487).

---

23 The Council acknowledges its sources in accordance with the 'Author-date' system described in the Commonwealth of Australia 2002, *Style manual*, 6th edn, John Wiley & Sons Australia Ltd, pp. 187-232.

The new Review Council notes that the Applicant did not provide the page citation for any of the following extracts. Where possible, these have been sourced by the new Review Council.

The new Review Council uses the English spelling for 'haemorrhoids' and 'manoeuvre'. However, the US variant 'hemorrhoids' and 'maneuver' are equally acceptable (see *The Macquarie dictionary 2009*), and are used in a number of citations set out in these Reasons, all of which have been retained in their original form.

24 Glaister, DH 1988, 'The effects of long duration acceleration', in *Aviation Medicine*, Ernsting, J and King, P (eds.), Second edition, chaps.10 & 11, pp. 139-165, see SMRC Folder 2, article 7.

25 Authors in DeHart, RL (ed) 1985, *Fundamentals of Aerospace Medicine*, Lea & Febiger, Philadelphia, p. 577, see SMRC Folder 2, article 8.

26 Burton, RR Leverett, SD and Michaelson, ED 1974, 'Man at high sustained +Gz acceleration: a review', *Aerospace Medicine*, vol. 45(10), pp. 1115-1136, see SMRC Folder 2, article 9.

27 Authors in DeHart, RL (ed) 1996, *Fundamentals of Aerospace Medicine*, Williams & Wilkins, Baltimore, pp. 232, 247-250, 649, see SMRC Folder 2, article 10.

28 Burkitt, DP 1975, 'Hemorrhoids, varicose veins and deep vein thrombosis: epidemiologic features and suggested causative factors', *The Canadian Journal of Surgery*, vol. 18, pp. 483-8, see SMRC Folder 2 article 12.

> Understandably if the sphincter does not oppose these pressures then a hemorrhoid could develop when exerting abdominal strains such as when countering increased G forces (Applicant letter dated 25 July 2005).

49. The Applicant contended that while it would appear there is a lack of study into G forces affecting the onset of haemorrhoids:

> …Should the sphincter be weakened from constant exposure to high altitude flight in high performance aircraft then could not the onset of high G be the cause of hemorrhoids (Applicant letter dated 25 July 2005).

50. In his complementary oral submission (made at the previous Review Council's meeting on 8 December 2006), [29] the Applicant stated that he was most concerned with:

> A distinct period from the 1950's to the 1970's where most of our Jet flying was high altitude around 40,000 feet, and the type of adversary we had was a one on one situation and this type was combat fighting and it was a gun combat environment.
>
> The aircrafts we flew were these Vampire 35's and 31's, they were very manoeuvrable aircrafts, we could sustain G force from a very high altitude down to the ground.
>
> So we had this high G manoeuvre which we could sustain for quite a few minutes for a long period of time and your aircraft, well you're twisting in the seat, back over the shoulder and back to the other side.
>
> The environment we flew in was very harsh particularly in Malaya, Thailand, Singapore and Borneo. We sat on the pipelines for long periods of time in a cockpit, helmet, G Suit, 'Mae West' [30] with no protection whatsoever, sometimes were offered those small Asian umbrellas for over the top and the dehydration rate was extreme…Many of us suffered constipation, a lot of us suffered diarrhoea…So we had that era of high manoeuvre high sustained G, one on one, harsh unprotected environment.

51. The Applicant also made comments, from his own experience and knowledge, on the incidence of haemorrhoids in 1950-1970's era fighter pilots. The Applicant sought to compare this anecdotal evidence with the findings of Dennison, A R et al 1994 (which was information available to the RMA, see **Appendix B**) [31] and Perraud R C et al 1983 [ABSTRACT] (which is new information, see **Appendix D**).[32]

52. The Applicant claimed that 4 of the 30 fighter pilots stationed in Malaya in the 1960's suffered from haemorrhoids, noting that: 'that seems to be about 12 to 13%'.

---

29 Transcript at pages 5 - 6.

30 Defined in *The Macquarie dictionary 2009* as: 'an inflatable life-preserving jacket for airmen or sailors who fall in the sea [named after *Mae West*, 1892 - 1980, US actress].'

31 Dennison, AR Paraskevopoulos, JA Kerrigan, DD & Shorthouse, AJ 1996, 'New thoughts on the aetiology of haemorrhoids and the development of non-operative methods for their management', *Minerva Chirurgica*, vol. 51(4), pp. 209-16; see SMRC Folder 3 article 6.

32 Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983 [ABSTRACT], 'Hemorrhoid symptomatology and fighter pilots,' *Medecine Aeronautique et Spatiale,* vol. 22, pp. 328-332. Also in **Appendices F and G,** and English translation in **Appendix H**.

> Haemorrhoids are rare below 20 years of age…Dennison, AR et al 1994, at p. 211;
>
> …it seems to show an increased 'incidence;'
>
> 'non-significant at 5%.' Perraud, R C et al 1983, per Abstract. [33]

53. The Applicant also referred the new Review Council to the Civil Aviation Safety Authority (CASA) Medical Examiners' Handbook. [34] In the Applicant's submission, this was an authoritive document, which the Applicant noted was not in the information obtained by the RMA and sent to the new Review Council. In the Applicant's submission, the CASA Handbook was supportive of his contentions:

> Haemorrhoids will occur due to inadequate seating and dehydration (at 2.9.19).

54. In conclusion, the Applicant submitted that he had put forward:

> a reasonable hypothesis…that dehydration, or nutrition or possibly stress or demanding physical work for the fighter pilot at least causes constipation and diarrhoea which initiates haemorrhoids…[35]

Applicant did not comment on the Proposed Scope of Review and Proposed Pool of Information decisions

55. The Applicant made no comment on the new Review Council's proposed scope of review and proposed pool of information decisions, other than commenting upon the 'new' information noted above and included in **Appendix D**.

56. The Applicant referred the new Review Council to some materials (listed in **Appendix D**) that were not available to (not before) the RMA (which the Applicant contended were in existence at the relevant times, and so could have been accessed by the RMA). The new Review Council noted the Applicant's submission about these materials, but was unable to take them into account for the purposes of the review into the new SoPs, because they were not available to (not before) the RMA at the relevant times.

---

33 **Appendices D and F**. See [62] and [165] - [171]. The Applicant commented in his letter of 2 August 2010 that:

> an average fighter pilot has above average physical condition compared to the average population which would comprise a 'control group' upon which comparisons would be made. In fact a fighter pilot is almost an elite athlete. Therefore would not an occurrence of haemorrhoids be caused by environmental conditions unique to that group of pilots and not experienced by a control group. To indicate no significant difference between the two populations I would suggest is in error. I further suggest if the fighter pilots' physical condition was regarded as average then the degree of disability would be significantly higher than the control group.

34 Civil Aviation Safety Authority CASA 2005, Designated Aviation Medical Examiners' Handbook, Version 3.2, 2. Medical Aspects and 2.9 Gastroenterology, accessed by the Council on 8 December 2006 via http://www.casa.gov.au/manuals/regulate/dame/index.htm, pp. 1-16 see **Appendix D**.

35 A view which the Applicant contended in his comments of 2 August 2010 was supported by Perraud et al 1983 [new information, see English translation in **Appendix H**). See too, the Applicant's complementary oral submission, transcript at p. 9.

THE COMMISSION'S SUBMISSIONS

57. The Commission made a written submission (August 2005), and an oral submission complementing its written submission. [36]

58. A Medical Officer with DVA represented the Commission at the previous Review Council's meeting on 31 October 2006, and was the principal author of the Commission's written submission to the previous Review Council (taken to be a written submission to the new Review Council).

59. The Commission submitted that there were no epidemiological studies, nor even case reports, concerning an association between G forces and haemorrhoids in the information available to the RMA at the relevant times.

60. The Commission submitted that:

> there is a widely held belief amongst crew of high performance aircraft that haemorrhoids are an occupational hazard

but submitted further that the information available to the RMA did not allow any conclusions to be drawn about that belief.

61. The Commission submitted that, in the absence of epidemiological evidence, the most that could be said was that the asserted association may be biologically plausible. Based on the information available to the RMA, the Commission submitted:

> G forces and anti-G manoeuvres and suits can cause increased intravascular pressure and increased intra-abdominal pressure.
>
> However, the role of these factors in the causation of haemorrhoids remains unclear and indeed, the pathogenesis of the condition is poorly understood.
>
> In any event, biological plausibility alone is not sufficient to indicate that haemorrhoids can be caused by G forces. [37]

62. The Commission identified one article published in a French journal in 1983,[38] that it submitted touched on (was relevant to) the review of the new SoPs, but was information

---

36 The discussion of the Commission's submissions set out in these Reasons is derived from the written submission and complementary oral submission here identified.

The new Review Council has presented references as set out in the written submissions to it. However, the Council acknowledges its sources in accordance with the 'Author-date' system described in the Commonwealth *Style manual* (as per footnote 23).

37 See the Commission's written submission at page 4.

38 Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, 'Symptomatologie Hemorroidaire et Pilotes de Chasse,' *Medecine Aeronautique et Spatiale,* tome XXII, pp. 328-332.

which was not available to the RMA. The Commission made the following submission on the basis of the abstract of the article which was in English: [39]

> the report is of a cross-sectional questionnaire-based survey of 70 French fighter pilots and 70 male controls. The reported result was of an increased 'incidence' of haemorrhoids in the pilot group that was 'non-significant at the 5% level.'
>
> No further details are available from the abstract.

The Commission did not comment on the proposed Scope of Review and Proposed Pool of Information decisions

63. The Commission made no comment on the new Review Council's proposed scope of review and proposed pool of information decisions.

64. As mentioned above, the Commission referred the new Review Council to the abstract of an article (listed in **Appendix F**) that was not available to (not before) the RMA. The new Review Council noted the Commission's submission, but was unable to take the abstract or the article [40] into account for the purposes of the review of the new SoPs, because they were not available to (not before) the RMA at the relevant times. [41]

REASONS FOR THE NEW REVIEW COUNCIL'S DECISION

The new Review Council's Task

65. In conducting a review the Council follows a two-step process.

66. The new Review Council first identified the pool of information, ie by identifying from all the information that was available to the RMA when it determined, amended, or last amended the Statements of Principles, the sound medical-scientific evidence (as that term is defined in section 5AB(2) of the VEA), [42] which in its view 'touches on' (ie is relevant to), the issue of whether a particular kind of injury, disease or death can be related to service.

67. The second step required the new Review Council to determine whether the sound medical-scientific evidence in the pool of information:

    67.1. 'points to' (as opposed to merely 'leaves open') [43] the relevant possibility (whether 'Effect of high 'G' Forces' and/or 'Effect of the anti 'G' straining

---

39 Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983 [ABSTRACT], 'Hemorrhoid symptomatology and fighter pilots,' *Medecine Aeronautique et Spatiale,* vol. 22, pp. 328-332, see the Commission's written submission at page 5 and **Appendices D, F and G**.

40 In French or in English.

41 See [165] - [171].

42 See [7].

43 See full Federal Court decision at [49] per Branson J.

manoeuvre' [44] (if found to exist in a particular case) could provide a link or element in a reasonable hypothesis connecting haemorrhoids or death from haemorrhoids to relevant [45] service). [46] The new Review Council had to find that the hypothesis contended for was reasonable, and not one which was 'obviously fanciful, impossible, incredible or not tenable or too remote or too tenuous.' [47]

67.2. concerning 'Effect of high 'G' Forces' and/or 'Effect of the anti 'G' straining manoeuvre' (if found to exist in a particular case) could provide a relevant connection between haemorrhoids or death from haemorrhoids and relevant [48] service according to a standard of satisfaction 'on the balance of probabilities,' or as being 'more probable than not'.

68. In these Reasons the association for both the reasonable hypothesis test ([67.1]) and the balance of probabilities test ([67.2]) are respectively referred to as the 'relevant association'.

69. It was with these tests firmly at the forefront of its collective mind that the new Review Council considered the sound medical-scientific evidence in the pool of information, and the submissions made by the Applicant and the Commission referable to the matters within the scope of review.

70. In forming its judgement on whether the sound medical-scientific evidence 'pointed to' the relevant association, the Council was conscious that the reasonable hypothesis test is 'a test of possibility' [49] and 'an unusually light burden.' [50] If the reasonable hypothesis test was found not to be satisfied, the balance of probabilities test necessarily could not be met.

---

44 The new Review Council's final decision on the scope of review was to exclude the possible excision or amendment of the existing factors in Statement of Principles No. 41 at 2008, of being obese at the time of the clinical onset or the clinical worsening of haemorrhoids, see [71] - [74] below.

45 Relevant service here refers to operational, peacekeeping and hazardous service, and warlike and non-warlike service as those terms are defined in the VEA and the MRCA.

46 See *Vietnam Veterans' Association of Australia (NSW Branch) Inc v Specialist Medical Review Council and Anor* (2002) 69 ALD 553 (Moore J decision) per Moore J at [29].

47 See the full Federal Court decision in *Repatriation Commission v Bey* (1997) 79 FCR 364 which cited with approval these comments from Veterans' Review Board in *Stacey* (unreported 26 June 1985), all of which were in turn cited with approval in the Moore J decision at [33].

48 Relevant service here refers to eligible war service (other than operational service), defence service (other than hazardous service), and peacetime service as those terms are defined in the VEA and the MRCA.

49 See full Federal Court decision at [49] citing with approval Spigelman CJ in the New South Wales Court of Appeal decision at [111].

50 See full Federal Court decision at [55] per Branson J.

Scope of Review

71. The new Review Council's final view on the scope of the review was that it should comprise the scope which the new Review Council had identified on a preliminary basis in respect of the 'Effect of high 'G' Forces' and/or 'Effect of the anti 'G' straining manoeuvre' only. [51]

72. As mentioned above, the new Review Council included within its preliminary decision on the scope of review the possible excision or amendment of the existing factors in Statement of Principles No. 41 of 2008, of being obese at the time of the clinical onset or clinical worsening of haemorrhoids. The new Review Council noticed that the new SoPs had included the 'being obese' factors for the first time. In the new Review Council's preliminary view, being obese was not regarded in clinical practice as having a relevant association with haemorrhoids.

73. In making its final decision on scope, however, the new Review Council decided against including the existing 'being obese' factors. Neither the Applicant nor the Commission had expressed any interest in the 'being obese' factors, nor their possible excision or amendment. [52]

74. Further, the new Review Council identified that there was some sound medical-scientific evidence available to the RMA at the relevant times, which supported the relevant association between obesity and haemorrhoids.

Pool of Information

75. The new Review Council's final decision on the pool of information was that it should comprise the sound medical-scientific evidence it had identified on a preliminary basis[53] as listed in **Appendix A**.

76. In reaching this decision the new Review Council took into account the written submissions and complementary oral submissions, and considered whether any of the information to which it was referred, could or should be in the pool.

77. As mentioned above, the new Review Council noted the Applicant's and the Commission's references to, and submissions concerning, information which was not available to (not before) the RMA (see **Appendices D & F**). The new Review Council had also identified further new information (see **Appendix G**) which was not available

---

51 See [38].

52 Both the Applicant and the Commission were advised by letters dated 26 July 2010 of the new Review Council's revised preliminary decision on the scope of review (the proposal to limit the scope of the review to the 'Effect of high 'G' fores' and/or 'Effect of the anti 'G' straining manoeuvre' only), and were provided with an opportunity to comment by 16 August 2010. No comments on the revised preliminary decision on the scope of review were received by 16 August 2010 or at all.

53 See [41] and [43].

to (not before) the RMA. As mentioned above, the new Review Council in the review of the new SoPs was unable to (and so did not) consider information which was not available to (not before) the RMA at the relevant times.

THE NEW REVIEW COUNCIL'S ANALYSIS OF THE INFORMATION IN THE POOL

Preliminary Comment on Haemorrhoids, G Forces and the anti-gravity straining manoeuvre

78. Set out below are some general and introductory comments on haemorrhoids and G forces respectively, and the new Review Council's analysis of the information in the pool.

79. Important considerations in the new Review Council's analysis of the information was the nature:

79.1. and definition of haemorrhoids;

79.2. of G forces; and

79.3. of the anti-G straining manoeuvre.

80. 'Haemorrhoid' is a term widely applied in general society, but not always in the strict or correct medical sense. In conducting its review, the new Review Council applied the definition of 'haemorrhoids', as set out in [3(b)] of new SoPs:

> **"haemorrhoids"** means inflammation, bleeding, thrombosis, prolapse or symptomatic enlargement of the haemorrhoidal cushions. This definition excludes anorectal varices.

81. The new Review Council considered that the definition referred only to the haemorrhoidal cushions.

82. The new Review Council also noted that [3(c)] of the new SoPs states that:

> haemorrhoids attract the ICD-10 AM Code 184; [54] 0.22.4; [55] or 0.87.2. [56]

The ICD-10 Codes encompass two anatomically proximate, but pathologically distinct entities, namely, internal haemorrhoids and anal thrombosis.

83. So far as characterisation of the disease is concerned, the new Review Council at all times remained cognisant of the definition in the new SoPs. However, in analysing the information, the new Review Council was also conscious of the broader coverage of the ICD -10 Codes.

84. Had the new Review Council considered that the outcome of its review may have been different, depending upon whether the narrower definition in the SoPs, or the broader coverage of the ICD-10 Codes applied, the new Review Council would have considered a potential amendment to the definition. However, in the new Review Council's view, even if the broader coverage of the ICD-10 Codes was applied, the outcome of the review was the same.

Haemorrhoids (as defined in the new SoPs)

85. At the upper end of the normal human anal canal, the submucosal tissue is expanded into three or more distinct bulges called 'anal cushions.' The anal cushions protrude into the anorectal lumen such that, with the anal canal at rest, their overlying mucosal surfaces make contact with each other and seal the anal canal to the involuntary passage of flatus or stool. In certain circumstances, these anal cushions become enlarged **–** expanded by an increased amount of submucosal tissue, elastic tissue and small blood vessels, primarily arterioles.

---

[54] See **Appendix G** – New Information.

WHO 2006, 'ICD-10 (relevant to haemorrhoids)

ICD Code	Title
184	Haemorrhoids
184.0	Internal thrombosed haemorrhoids
184.1	Internal thrombosed haemorrhoids with other complications
184.2	Internal haemorrhoids without complication
184.3	External thrombosed haemorrhoids
184.4	External thrombosed haemorrhoids with other complications
184.5	External thrombosed haemorrhoids without complication
184.6	External haemorrhoids without complication
184.7	Unspecified thrombosed haemorrhoids
184.8	Unspecified haemorrhoids with other complications
184.9	Unspecified haemorrhoids without complication

[55] ICD-10 Code 022.4 refers to pregnancy.

[56] ICD-10 Code 087.2 refers to childbirth and the puerperium.

86. These congested and enlarged anal cushions – which constitute the strict definition of haemorrhoids in the new SoPs – are prone to slide down the anal canal, during defaecation and during physical exertion, possibly to the point of protruding externally. Furthermore, they are prone to bleed under these influences; such bleeding is typically bright red, in keeping with the arteriolar (rather than venous) origin of the bleeding. Thus, haemorrhoids characteristically cause anal protrusion and/or bleeding with defaecation and/or exertion. Unless otherwise complicated, they are generally painless.

87. Because haemorrhoids are a common (and even more commonly postulated) cause of anal symptoms, many theories of their causation exist in the absence of strong epidemiological and other evidence to support the theories.

88. As a general rule, haemorrhoids are believed to be provoked by spending an excessive amount of time and effort in the process of effecting rectal evacuation (an understanding reflected in existing factors in the new SoPs). This explains why haemorrhoids are linked both to the presence of constipation and to a bowel habit associated with loose stools; in both variations of the notionally ideal bowel habit, individuals are prone to spend more time on the toilet, and to strain more in the process of initiating, propagating and/or completing their bowel actions. Hence, both constipation and diarrhoea are said to provoke haemorrhoidal congestion and associated symptoms. [57]

Anal and haemorrhoidal thrombosis (broader ICD-10 Codes)

89. Many different types of vigorous physical exertion are known to precede (and, hence, presumably provoke) the occurrence of sudden and painful perianal swellings. The cause of the swelling is spontaneous thrombosis within the superficial circulation of the perianal skin, anal canal and/or anal cushions (haemorrhoids). The resulting swellings might be entirely subcutaneous (and hence external to the anal canal), or might extend to a variable extent into the anal canal. Individuals with pre-existing haemorrhoids, already causing protrusion and/or bleeding, might experience extensive thrombosis affecting the haemorrhoidal circulation, so-called 'prolapsed, thrombosed haemorrhoids.'

90. The sort of straining that might precede sudden episodes of thrombosis includes straining to deliver a baby, straining in the face of diarrhoea or constipation (anal sphincter and pelvic floor relaxed); and straining in the process of vigorous physical exertion including lifting heavy weights (anal sphincter and pelvic floor contracted).

[57] Straining at stool due to constipation or diarrhoea (within the timeframe set out) are existing factors in the new SoPs.

G-forces [58]

91. The terms G force and G acceleration are frequently used interchangeably. G force is a multiple of the normal acceleration due to the Earth's gravity (9.8 ms^{-2}). That is 1G = 9.8 ms^{-2}.[59]

92. A three-axis co-ordinate system is used by international convention to describe the direction of an applied acceleration. Acceleration can be applied in the longitudinal (head-to-foot) axis (z), the transverse (front to back) axis (x) or the lateral (side to side) axis (y). The acceleration is also expressed as either positive (+) or negative (-).[60]

93. The Gz limits of a particular aircraft are largely determined by aerodynamic and engine performance factors inherent in the aircraft's design. Pilots are mainly exposed to head-to-foot (positive) +G. High +Gz loads are produced by air combat manoeuvring (ACM, or 'dog-fighting'), air-to-surface weapons delivery profiles, evasive manoeuvres and aerobatic flight. ACM imposes the most frequent and stressful series of accelerative changes on both the airframe and the pilot. It is an extremely physically and mentally demanding, and highly dangerous, form of flying. A typical ACM sortie usually involves frequent and repetitive excursions to high +Gz levels, often to the +Gz design limits of the aircraft.[61]

The Physiological Consequences of Acceleration

94. The physiological consequences of acceleration depend on both the magnitude of the acceleration and the axis in which it is applied. The human body is particularly sensitive to acceleration in the longitudinal or z axis. Weight is altered by the level of applied +Gz. This can adversely affect mobility, as the arms and legs will weigh proportionally more under high levels of +Gz, but the muscles responsible for their movement will be no stronger. At approximately +8 Gz movement of the upper limbs above the head becomes impossible. If a pilot wearing a protective helmet allows his/her head to flex forward under approximately +4 Gz, the head cannot then be raised until the +Gz load has been reduced. Neck injuries are common sequelae of exposure to the high +Gz environment.[62]

95. Exposure to high levels of applied +Gz causes considerable fluid shifts and redistribution throughout the body and pooling in the extremities. The principal problem faced by the human cardiovascular system is the system's ability to maintain the

---

58 The list of articles on G forces considered and referenced by way of footnotes in these general and introductory comments are contained in **Appendix A** (for information in the pool) and **Appendix G** (for new information).

59 Burns, JW 1995; Burton, RR et al 1974 (see **Appendix A**); and Burton, RR & Whinnery, JE 1996; Glaister, DH & Prior, ARJ 1999 (see **Appendix G**).

60 Burns, JW 1995; Burton, RR et al 1974 (see **Appendix A**); and Burton, RR & Whinnery, JE 1996; Glaister, DH & Prior, ARJ 1999; Parkhurst, MJ et al 1972 (see **Appendix G**).

61 Burns, JW 1995; Burton, RR et al 1974 (see **Appendix A)**; and Burton, RR & Whinnery JE 1996; Glaister, DH & Prior, ARJ 1999; Newman, DG & Callister, R 1999 (see **Appendix G**).

62 Newman, DG 1997 (see **Appendix G**).

required level of blood-flow to the brain. When this does not occur, G-induced loss of consciousness (G-LOC) results. G-LOC is still a major operational flight safety hazard.[63] The observed rate of G-LOC in international studies ranges from 8 to 19%.[64]

Protection Against the Adverse Effects of +Gz

96. Given the risk of G-LOC, it is clearly essential for pilots to be protected from the adverse consequences of G exposure. There are several protective strategies that fighter pilots can use to combat the potentially dangerous effects of high G. Avoiding or minimising the factors that lower or reduce G tolerance is important. These factors include dehydration, fatigue, hypoxia, and the effects of alcohol.

97. Regular exposure to the G environment helps train the compensatory reflexes of the cardiovascular system. Adaptation to the adverse effects of high +Gz through regular and repetitive exposure has been documented.[65]

98. With appropriate and fully optimised anti-G counter-measures, the fighter pilot can withstand +Gz levels of up to +9 Gz for short periods of time.[66]

Anti-gravity straining manoeuvre

99. The Anti-G Straining Manoeuvre (AGSM) involves repetitive 3-second cycles of expiratory effort (straining, or the Valsalva manoeuvre) against either a partially or completely closed glottis, in conjunction with isometric tensing of the lower limb musculature and abdominal wall.[67]

100. The AGSM is known as the L-1 manoeuvre when the Valsalva strain is done against a closed glottis. The M-1 manoeuvre involves the combination of muscle tensing with exhalation of air through a partially closed glottis while straining. The M-1 tends to produce a lower intra-thoracic pressure, so is no longer a recommended technique.

101. Both intrathoracic and intra-abdominal pressures are elevated with the AGSM. The increased intrathoracic pressure developed by the AGSM is transmitted directly to the heart and vascular system, promoting cerebral blood flow. Under high +Gz, this helps maintain blood flow and oxygen delivery to the brain, thus preserving consciousness.

---

63 Green, ND & Ford, SA 2006; Rickards, CA & Newman, DG 2005; and Whinnery, JE 1986 (See **Appendix G**).

64 Rickards, CA & Newman, DG 2005 (see **Appendix G**).

65 Green, ND 1999; and Newman, DG & Callister, R 2008 (see **Appendix G**).

66 Burns, JW 1995; Burton, RR et al 1974; (See **Appendix A**); Burton, RR and Whinnery, JE 1996; Green, ND 1999; and Packhurst, MJ et al 1972 (See **Appendix G**).

67 Buick, F et al 1992 (**Appendix G**); Burns, JW 1995 (**Appendix A**); Burton, RR & Whinnery, JE 1996; Cornwall, MW et al 1994; Green, ND 1999; Packhurst, MJ et al 1972; and Whitley, PE 1997 (see **Appendix G**).

102. While performing the AGSM, it is important that both exhalation and inhalation are accomplished as quickly as possible, so that the straining can be maintained. During the breathing cycle, blood pressure falls dramatically and the risk of unconsciousness due to high +Gz rises. The AGSM, if performed properly, is a physically demanding and extremely fatiguing manoeuvre, but can afford up to +4 Gz of protection.[68]

The G-suit

103. The G-suit is worn externally over the lower half of the body. It consists of 5 inter-connecting pneumatic bladders, one of which compresses the lower abdomen and the remaining four compress both thighs and both calves. The bladders are contained within a non-distensible fabric cover, and provide somewhere in the region of 30% coverage of the lower body. [69]

104. As the suit inflates in proportion to the +Gz load, the calves, thighs and lower abdomen of the pilot are compressed. This encourages venous return to the heart.

105. The G-suit, if fitted correctly, can provide up to +1.5 Gz of protection, an effect that is additive with the protection afforded by the AGSM.

Positive Pressure Breathing for G Protection

106. Positive pressure breathing for G (PBG) involves breathing air which is progressively pressurised as the applied +Gz load increases. The central underlying idea with PBG is that it effectively converts the usual AGSM into an automatic process requiring little conscious effort on the part of the pilot while achieving a similar +Gz tolerance outcome. [70]

107. Positive pressure is delivered according to a pressure schedule. With most PBG systems, positive pressure starts feeding in at around +4 to +5 Gz, and increases in a linear fashion with increasing +Gz load, reaching a level of 60 mmHg positive pressure at +9 Gz. [71]

DOES THE SOUND MEDICAL-SCIENTIFIC EVIDENCE 'POINT TO' OR 'LEAVE OPEN' THE RELEVANT ASSOCIATION?

108. As mentioned above, having settled the pool of information, the second question for the new Review Council to consider was whether the sound medical-scientific evidence in the pool of information 'points to' a potential factor in the scope of review as a link or element in a reasonable hypothesis connecting haemorrhoids or death from

---

68 Cornwall, MW et al 1994; and Green, ND 1999 (see **Appendix G**).

69 Burton, RR et al 1974 (**Appendix A**); Brook, WH 1990; Burton, RR & Whinnery, JE 1996; Green, ND 1999 (see **Appendix G**).

70 Burns, JW & Balldin, UI 1988; Burns JW 1988; Green, ND 1999; Pecaric, M & Buick, F 1992; Shaffstall, RM & Burton, RR 1979; and Travis, TW & Morgan, TR 1994 (see **Appendix G**).

71 Pecaric, M & Buick, F 1992; and Travis, TW & Morgan, TR 1994 (see **Appendix G**).

haemorrhoids to relevant service, [72] and if so, whether the relevant association exists on the balance of probabilities.

109. The only basis upon which the Council can review the contents of a Statement of Principles is by reviewing all the information that was available to (before) the RMA at the relevant times, in order to ascertain whether there was sound medical-scientific evidence upon which the RMA could have relied to amend either or both of the Statements of Principles.

110. The new Review Council considered all the articles in the pool. However, given the large number of articles in the pool, the new Review Council in these Reasons focused its discussion upon its analysis of those articles which it considered most pertinent to the issues before it.

111. Ultimately, matters of weight are questions for the new Review Council in the exercise of its expertise and scientific judgement, noting that the Councillors are appointed to a particular review because of their specialist expertise in the particular condition, and the matters within the scope of the review.

THE NEW REVIEW COUNCIL'S ANALYSIS OF THE INFORMATION IT CONSIDERED MOST IMPORTANT AS BEING POTENTIALLY REFERABLE TO THE CONTENDED FACTOR(S) EXPOSURE TO G FORCES AND/OR THE ANTI-GRAVITY STRAINING MANOEUVRE

Thomson, WHP 1975, 'The Nature and Cause of Haemorrhoids,' Proceedings of the Royal Society of Medicine, vol. 68, pp. 574 - 5.

112. This paper discussed the findings of an anatomical and clinical study of the anorectum, with special reference to the nature of haemorrhoids, based upon cadaveric anorectal specimens, haemorrhoidectomy specimens, patients with prolapsing piles, and normal controls. [73]

113. It was found that:

> a comparison of bowel histories showed a much greater prevalence of constipation and straining in patients with haemorrhoids than those without. [74]

114. It was suggested that piles may be an outward manifestation of the downward displacement of anal cushions. [75] If so, it was considered they would be more likely to be:

---

72 See [67] and the footnotes there cited.

73 See at page 574.

74 See at page 574.

75 See at page 574.

> pushed out by a large hard stool, which perhaps accounts for their association with constipation. Straining might cause suffusion of the venous dilatations with resultant swelling of the cushions and increased likelihood of their expulsion on defecation. [76]

Council's comments

115. The Council considered this paper important only so far as it assists in the understanding of the pathogenesis of haemorrhoids. As with the definition in the new SoPs, the study did not include anorectal varices in its definition of haemorrhoids.

116. The study did not touch on exposure either to G forces or the AGSM.

117. The new Review Council considered that it did not provide any assistance in respect of the posited association.

Delco, F & Sonnenberg, A 1998, 'Associations between haemorrhoids and other diagnoses,' *Disease of the Colon & Rectum,* vol. 41, no. 12, pp. 1534-1542.

118. This case-control study compared 96,314 subjects with haemorrhoids, with an equal number of control subjects without haemorrhoids, based on discharge information from hospitals of the United States Department of Veterans' Affairs between 1986 and 1996.

119. The aim of the study was to determine whether the:

> comorbid occurrence of haemorrhoids with a second disease in identical patients suggest[ed] that the two diseases share[d] a set of common risk factors or a set of common pathophysiologic pathways.[77]

120. The study was controlled for race, age and gender.[78] The cohort of patients with haemorrhoids was slightly older, contained more whites, and more males than the control population. [79] A study with such a large sample size was expected to, and did, reveal a statistical difference. [80]

121. The comorbid diseases with which haemorrhoidal disease showed significant associations [81] were allocated by the authors to five major categories:

121.1. diseases associated with diarrhoea;

121.2. spinal cord injuries;

---

76 See at page 574.

77 At page 1534.

78 See at page 1535.

79 See at page 1535.

80 See at page 1535.

81 See at page 1537.

121.3. constipation or varicose veins;

121.4. various types of anorectal diseases; and

121.5. conditions that could be considered manifestations or sequelae of the haemorrhoidal disease itself. [82]

122. However, it was noted that the allocation was somewhat arbitrary, and that constipation could belong in the group of anorectal disease, rather than in a separate category.[83] The common link, however, was thought to be that diseases associated with haemorrhoids appear to affect the sphincter tone. [84]

123. The authors noted that the large size of the study increased the power of the statistical analysis, but that it could also have identified statistically significant, but medically less important, differences.[85] The authors also recognised that the use of patient records had potential limitations. The authors considered that the odds ratios probably provided conservative estimates of the true strength of association between haemorrhoids and other disease.

124. The authors concluded that constipation was associated with haemorrhoidal disease, with an odds ratio of 1.54, and a 95% Confidence Interval of 1.48 to 1.61. [86]

Council's comments

125. A significant problem for the new Review Council with this study was one of definition. It was not clear to the new Review Council precisely what the authors meant by 'haemorrhoids.' As mentioned in the introductory comments above, the definition of haemorrhoids is critical to analysing the findings of any study. It is not sufficient, in the new Review Council's view, for a diagnosis of haemorrhoids to rest upon patient self-report.

126. That being said, the study was relevant to the scope of the review, as it was looking for **any** potential association. Of the five categories postulated by the authors, however, only constipation and diarrhoea, and the consequent potential link with straining, could bear any, and at best, an analogical relationship, to exposure to G forces and/or the AGSM.

---

82 See at page 1536.

83 See at page 1536.

84 See at page 1538.

85 See at page 1539.

86 See Table 3 at page 1538.

127. The new Review Council considered it was a strong paper on the basis of what it set out to analyse, however, it does not address matters within the scope of the current review.

128. The new Review Council considered that it did not provide any assistance in respect of the posited association.

Gibbons, C P, Bannister, J J and Read, N W 1988, 'Role of constipation and anal hypertonia in the pathogenesis of haemorrhoids,' *Br. J. Sur.,* vol. 75, pp. 656-660.

129. The aim of this study was to test the suggestion that haemorrhoids are caused by chronic constipation, by means of a relatively small study of bowel habit, anal pressure profiles, and anal compliance, in 13 men and 10 women with prolapsed haemorrhoids; 12 women with severe constipation; and 14 male and 11 female controls.

130. The authors concluded that:

> [c]onstipation does not appear to cause anal hypertonia, as our group of severely constipated women had normal anal pressure profiles and anal compliance. Abnormal anal pressures and compliance do not necessarily lead to haemorrhoid formation, because patients with anal fissures have very high resting anal pressures, but do not necessarily develop prolapsing haemorrhoids. Moreover, the prevalence of haemorrhoids increases with age, whereas the anal sphincter pressure tends to decrease.
>
> We therefore conclude that the decrease in anal compliance, the increase in anal sphincter pressure and the lengthening of the anal high-pressure zone seen in patients with haemorrhoids are attributable to a change in the tone of the internal anal sphincter occurring coincidentally with, or subsequent to, the hypertrophy of the anal cushions, rather than as a result of passive stretching of the sphincter by the increased bulk of the anal lining. Moreover, these effects do not appear to be related to any change in bowel habit. [87]

Council's comments

131. The new Review Council considered that this small study considered a broad pathogenesis of haemorrhoids, but again, it did not assist with the matters within the scope of the current review. It did not provide any relevant data on, nor mention, the potential exposure to G forces or the AGSM.

132. The new Review Council considered that it did not provide any assistance in respect of the posited association.

---

87 See at page 660.

Hyams, L and Philpot, J 1970, 'An Epidemiological Investigation of Haemorrhoids,' *The American Journal of Proctology,* vol. 21, no. 3, pp. 177-193.

133. The sample for this study was an epidemiological questionnaire administered to 1600 subjects, of which 1584 completed questionnaires were analysed. [88] A definition of constipation was applied, [89] and potentially confounding characteristics such as age, sex, socio-economic status, race and religion were taken into account.[90]

134. The authors concluded that their:

> main epidemiological findings are that socio-economic status and Jewishness are positively related to haemorrhoidal prevalence. The relationship to socio-economic status has been consistently found and may represent our most important aetiological clue. [91]

135. Dietary differences were identified as a unifying factor between socio-economic gradient and religious differences, with higher concentration of protein and fat, and the smaller carbohydrate component being relatively high in refined starches. [92]

136. The authors concluded that:

> we do not consider the time-honoured relation between constipation and haemorrhoids to be sacred… there is a scarcity of reliable data needed to confirm this hypothesis. Constipation may follow haemorrhoids or indeed be precipitated by them and haemorrhoids and constipation may develop independently of one another. [93]

Council's comments

137. The new Review Council considered that this was a dated paper, addressing the epidemiology of haemorrhoids. Again, it was based upon self-report of the condition, which in the new Review Council's view is inherently unreliable.

138. Again, there was no data relevant to the specific questions within the scope of the review. The study did not consider exposure either to G forces, or the AGSM.

139. The new Review Council considered that it did not provide any assistance in respect of the posited association.

---

88 See at page 178.

89 See at page 180.

90 See at page 180.

91 See at page 192.

92 See at page 192.

93 See at page 193.

Kaidar-Person, O, Person, B, Wexner, S 2007, 'Haemorrhoidal Disease: A Comprehensive Review,' *J Am Coll Surg,* vol. 204, no. 1, pp. 102-117.

140. The focus of this review paper was the relative benefits and disadvantages of various treatment modalities. However, the discussion of anatomy and physiology was considered potentially relevant, at least from a consideration of biological plausibility, of the exposure to G forces and/or the AGSM:

> Vascular cushions participate in the venous drainage of the anal canal. It has been suggested that their presence is essential for continence; they contribute approximately 15% to 20% of the resting anal pressure, so they intensify the action of the anal sphincter mechanism and shield the anal canal and the anal sphincter during the act of evacuation by filling with blood and providing extra padding. The vascular cushions congest during a Valsalva manoeuvre or when intra-abdominal pressure is increased, enabling the anal canal to remain closed; decongestion of the cushions, achieved by rapid decrease of anal tone, allows rapid emptying of the rectal content. [94]

Council's comments

141. In the new Review Council's view this was an important study. As mentioned above, the AGSM includes the valsalva manoeuvre, which is a forcible exhalation against a closed airway. [95] However, the new Review Council was unable to discern from the study any data supporting the authors' claim that vascular cushions conflated during the performance of the valsalva manoeuvre.

142. The study was consistent with exposure to G forces and/or the AGSM being biologically plausible as having the relevant association with haemorrhoids. However, in the new Review Council's view, there was no data which 'pointed to' the relevant association. The study's conclusions rested only upon the authors' assertions about the impact on the vascular cushions.

143. In the new Review Council's view, given the absence of any data, this study at best 'left open' the relevant association.

THE NEW REVIEW COUNCIL'S CONCLUSIONS ON THE CONTENDED FACTORS OF EXPOSURE TO G FORCES AND/OR THE ANTI - GRAVITY STRAINING MANOEUVRE

144. The new Review Council considered that biological plausibility attaches to the notion that the AGSM (as undertaken by fighter pilots during high +Gz ACM) might have the relevant association with haemorrhoids, the analogy being with constipation, diarrhoea, and straining at stool.

---

94 See at page 102.

95 See [99] - [102]. See too Glaister, DH 1988, at p. 160 – forced exhaling against a partially closed (M-1) or fully enclosed (L-2) glottis to create periods of raised intrathoracic pressure.

145. Note needs to made, however, of a subtle but potentially important difference. Straining at stool is undertaken in association with 'bearing down,' an action that is accompanied by relaxation of the anal sphincter mechanism and pelvic floor musculature. The AGSM is an intense Valsalva manoeuvre, with the glottis, anal sphincter, and pelvic floor near-maximally contracted to raise intra-abdominal pressure. This is more like the sort of 'straining' associated with heavy lifting than that associated with defaecation.

146. In the judgement of the new Review Council, the AGSM is not entirely analogous to the sort of straining typically thought to pre-dispose to haemorrhoids (see difference highlighted above in [145]). Hence, the link between the AGSM and the subsequent development of bleeding, prolapsing haemorrhoids is not considered quite so plausible.

147. On the other hand, straining appears to be equally likely to provoke anal and haemorrhoidal thrombosis (as encompassed within the ICD-10 Codes), whether or not the anal sphincter mechanism and pelvic floor are contracted. In this context, the plausibility of the AGSM as having the relevant association with anal and haemorrhoidal thrombosis is a little stronger than in the case of haemorrhoids.

148. The new Review Council agreed with the Commission [96] that there is biological plausibility to the relevant association between the AGSM and the occurrence of haemorrhoids, as defined in the new SoPs and referred to in the ICD-10 Codes.

149. However, biological plausibility is considered to be stronger in the case of anal and haemorrhoidal thromboses, than in the case of haemorrhoids (ie in the case of the broader coverage of the ICD-10 Codes, rather than the definition in the new SoPs). In particular, an intense session of high G-force manoeuvres might, as a matter of biological plausibility, provoke the onset of anal thrombosis.

150. The new Review Council noted the Applicant's anecdotal evidence [97] that haemorrhoids are considered virtually an occupational risk of flying under the conditions to which fighter pilots are exposed. The new Review Council also noted the commonly held belief among aviation clinicians that haemorrhoids are prevalent among fighter pilots, and an occupational risk within that cohort, noting that a term is used within the

96 See the Commission's comments on anecdotal evidence and biological plausibility at [60] - [61].

97 See footnote 22 and [51] - [52].

profession of 'G-roids'. [98] Again, though, there was no data or other medical-scientific evidence within the pool of information which touched on the posited association.

151. The full Federal Court held that:

> the criteria set out in s 5AB(2) by reference to which information is to be taken to be *'sound medical-scientific evidence'* are apt for consideration in respect of particular information, whether that information takes the form of an expression of expert opinion, a published study or an epidemiological survey. The terms of s 5AB(2), it seems to me, make it clear that it is at the stage of step one, not step two, that information is evaluated in the light of material published in learned journals, accepted medical practice and, if relevant, applicable epidemiological criteria for assessing causation. Information which satisfies the criteria set out in s 5AB(2) is *'sound medical-scientific evidence'* within the meaning of the Act. [99]

152. The new Review Council must review the contents of the new SoPs, not by determining whether a posited association is biologically plausible (biological plausibility is one of the Bradford Hill criteria which applies at Step 1 in determining the pool of information), but by determining whether the information that was available to the RMA at the relevant times 'points to' the relevant association, and if so, whether it is more probable than not. In the new Review Council's view, the information in the pool fell well short of 'pointing to' the relevant association. The information in the pool contained a lot of discussion of the disease, and various exposures, but none of those included exposures either to G forces or the AGSM.

---

98 See footnote 22.

The new Review Council also noted Welling, DR 2006, 'Military colon and rectal surgery practice', *Clinics in colon and rectal surgery*, vol. 19, no. 3, pp. 134-138.

This is new information (**Appendix G**), and because the research appears to be unpublished, the new Review Council considered it is likely not to be sound medical-scientific evidence.

However, it is consistent with a commonly held belief among military aviation medical practitioners that jet fighter pilots exposed to G forces commonly suffer from haemorrhoids.

The article describes US Air Force general military colorectal surgery practice and the author's personal experience as a military colorectal surgeon. In describing simple conditions subject to frequent complaint in the military the author states:

> Hemorrhoids are a common source of complaint among fighter pilots, who are subjected to G forces (see at p. 135).

Further, Snyder and Kearney 2002 (at p. 72) (**Appendix A**) are of the view that there may be under-reporting of haemorrhoids (as they say there is of hernia) by pilots and aircrew, including in the RAAF, due to medical standards disqualifying pilots and aircrew with such diseases.

Perraud et al 1983 [in FRENCH] (at pp.328 & 330) and [ABSTRACT] page 1 (**Appendices D, F and G**) make a similar observation in respect of haemorrhoids. See too [52], [62] and [165] - [171].

The Applicant in his comments of 2 August 2010 contended that:

> pilots are reluctant to report medical conditions that may adversely affect their 'licence' to fly. There is also the reluctance to report conditions that are deemed embarrassing and sensitive.

See too Authors in DeHart, RL ed. 1985 at p. 557 and 1996 at p. 649 (**Appendix A)** and CASA 2005 (**Appendix G**).

99 Full Federal Court decision per Branson J at [47].

153. The simple fact seems to be that the information did not contain any data touching on the posited association. The best data within the pool of information comprised only retrospective reviews, which provide a 'best guess' as to why a particular observation occurred. Further, none of those reviews touched on the exposure either to G forces or the AGSM. A prospective study or studies do not appear to have been done. The lack of such a study or studies may be explained by the high level of acceptance of the posited association within the jet fighter and aviation clinicians' communities.

154. It seems to the new Review Council that a well-constructed prospective study should be undertaken.

155. In conclusion, on the exposure to G forces and/or the AGSM, the new Review Council considered there was biological plausibility, as discussed above. However, the information did not 'point to' the relevant association. It merely 'left open' the possibility of the relevant association.

THE NEW REVIEW COUNCIL'S CONCLUSIONS ON WHETHER THERE SHOULD BE FACTORS OF AN 'EFFECT OF HIGH 'G' FORCES' AND / OR AN 'EFFECT OF THE ANTI 'G' STRAINING MANOEUVRE'

156. The new Review Council, having closely analysed all the information in the pool, placed particular weight on the articles discussed in detail above. The critical question for the new Review Council was whether the sound medical-science 'points to', as opposed to merely 'leaves open', the possibility of the relevant association. [100]

Effect of high 'G' forces' and / or 'Effect of the anti 'G' straining manoeuvre'

157. While the new Review Council identified sound medical-scientific evidence touching on the 'effect of high 'G' forces' and the 'effect of the AGSM,' which was included in the pool of information,[101] and which was closely analysed by the new Review Council, that sound medical-scientific evidence did **not** touch on the relevant association with haemorrhoids.

158. For the reasons discussed in detail above, the new Review Council concluded that the sound medical-scientific evidence available to (before) the RMA at the relevant times was insufficient to justify amending the reasonable hypothesis Statement of Principles Number 41 of 2008 to include as factors 'Effect of high 'G' Forces' and/or 'Effect of the anti-G straining manoeuvre.'

159. Having reached this conclusion, the Council necessarily found that the sound medical-scientific evidence available to (before) the RMA at the relevant times was insufficient to justify amending the balance of probabilities Statement of Principles Number 42 of 2008

---

100 See full Federal Court decision at [49] per Branson J, and [67] of these Reasons.

101 See **Appendix A.**

to include as factors ‘Effect of high ’G’ Forces’ and/or ‘Effect of the anti-G straining manoeuvre’.

THE NEW REVIEW COUNCIL’S ANALYSIS OF THE 'NEW INFORMATION' CONCERNING THE CONTENDED FACTORS OF ‘EFFECT OF HIGH ’G’ FORCES’ AND/OR ‘EFFECT OF THE ANTI-G STRAINING MANOEUVRE’

160. As mentioned above, the new Review Council identified in the information sent by the RMA (as listed in **Appendix B)**, a submission to the RMA, that included references to information that the new Review Council considered potentially could be relevant to the contended factors of ‘Effect of high ’G’ Forces’ and/or ‘Effect of the AGSM’. This information was not available to (not before) the RMA, and so could not, and was not, considered by the new Review Council in the review. It has the status of 'new information’ (as listed at **Appendix G**).

161. The new Review Council also noted the Commission's submission and the Applicant's complementary oral submission about a study that the new Review Council agreed may be potentially relevant to the contended factors. A copy of that study in French was obtained by the new Review Council and is listed in **Appendices D, F and G.** [102] An English translation was obtained by the new Review Council. The translation was undertaken by a person who, while having tertiary qualifications in the French language, is not accredited by the National Accreditation for Translators and Interpreters Ltd (NAATI), and does not have medical-science expertise (see footnote 104 and **Appendix H**).

162. Again, this information is 'new information', that is, it is information that was not available to (not before) the RMA. Accordingly, it was not taken into account for the purposes of the review.

163. Rather, the new Review Council considered the new information to determine whether, in its view, it warranted the new Review Council making any directions or recommendations to the RMA.

164. In the new Review Council's view, any such direction or recommendation should only be made if it were to form the view that the new information:

164.1. comprised sound medical-scientific evidence as defined in section 5AB(2) of the VEA, being information which epidemiologists would consider appropriate to take into account; and

– in the new Review Council's view, 'touches on' (is relevant to) the contended factors of ‘Effect of high ’G’ Forces’ and/or ‘Effect of the anti-G straining manoeuvre; and

[102] See [28.2], [52], and [62].

- has been evaluated by the new Review Council according to epidemiological criteria, including the Bradford Hill criteria; and
- could potentially satisfy the reasonable hypothesis and balance of probabilities tests. [103]

Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, 'Symptomatologie Hemorroidaire et Pilotes de Chasse,' *Medecine Aeronautique et Spatiale,* tome XXII, pp. 328-332. [104]

165. This is a cross-sectional, questionnaire-based survey of 70 French fighter pilots and 70 male controls, although it also refers to a case study of a fighter pilot who at a post-flight medical examination had a ruptured exterior haemorrhoid.

166. The article describes pathophysiology of haemorrhoids related to aeronautical factors in respect of acceleration and G forces, the equipment (AGSM) used by aircrew, the type of flying, and aircrew personal hygiene.

167. The authors report findings of an increased 'incidence' of haemorrhoids in the pilot group, which they categorised as 'non-significant at the 5% level.' [105]

Council's comments

168. The new Review Council noted this was a relatively small study, based on 70 questionnaires.

---

103 See [67].

104 This article was obtained by the new Review Council in its published form in French (see **Appendix G**), although the Commission obtained, and sent on request to the new Review Council, the abstract which was in English ('Hemorrhoid symptomatology and fighter pilots' see **Appendices F and D**).

Since both the Commission and the Applicant had referred to the English abstract, and given the potential for the article to be of seminal significance (as the only article known to the new Review Council which potentially touched on the very issue within the scope of review), the new Review Council obtained an English translation (**Appendix H**).

The new Review Council noted that the English translation it obtained was undertaken by a person who is not an accredited translator with NAATI, and who does not have medical-scientific expertise. The translation was considered sufficient for the new Review Council's limited purpose of considering the article, on a very preliminary basis, as new information. However, the new Review Council considered that the translation should not be relied upon in any further investigation, but that a translation should be obtained from a person accredited with NAATI, and potentially with medical-science expertise.

The new Review Council circulated to the Commission and the Applicant a copy of its English translation by letters dated 26 July 2010, subject to the above disclaimer, and gave both the Commission and the Applicant an opportunity to comment on the translation and on the article by 16 August 2010.

The Applicant made comments by letter dated 2 August 2010, which are referred to above (see footnotes 22; 33; 35; and 98).

The Commission advised that it did not wish to comment.

105 See the Abstract (**Appendices F and D**), and see at page 4 of the English translation obtained by the new Review Council (at **Appendix H**).

169. The new Council notes the comments it has already made about the difficulties of drawing conclusions from studies involving self-reporting. [106] However, the authors report that 7 subjects out of 52 pilots who responded to the questionnaire stated they had sought medical attention, and 5 subjects had made a direct relationship between their reported symptoms and aircraft flight.

170. This was the only study which directly researched the matters within the scope of the review. The study found pilots had a positive trend towards haemorrhoids. However, while the new Review Council noted the Applicant's comments in his letter of 2 August 2010, [107] it agreed with Perraud et al that the findings were not statistically significant. Further, the new Review Council considered that the definition of haemorrhoids was unreliable, as the occurrence of haemorrhoids was self-reported. While the authors state that 7 subjects out of 52 pilots had sought medical attention, the outcome of that medical evaluation is not stated in the study.

171. While the study recognised that the perineal region is unprotected from the effects of exposure to G forces and/or the AGSM, and was consistent with that exposure being biologically plausible as having the relevant association with haemorrhoids, in the new Review Council's view this study could not potentially meet the reasonable hypothesis test and at best 'left open' the relevant association.

CASA Handbook

172. The Applicant referred to the CASA Handbook. [108]

173. In the new Review Council's view, the CASA Handbook is not peer-reviewed, and not sound-medical scientific evidence. CASA is a regulatory, not a medical-scientific body, and its handbook is expressly published as being for guidance only.

174. While the new Review Council noted that the extract cited by the Applicant was supportive of other anecdotal evidence of the relevant association, it was not on the basis of the effects of high G forces and/or the AGSM.

Balance of the 'new information' in Appendices D, F and G

175. The new Review Council analysed in detail all the 'new information' in **Appendices D, F and G.** In particular, the new Review Council considered of potential significance:

175.1. Perraud et al; [109]

---

106 See [87], [125] and [137].

107 See footnote 33.

108 See [53].

109 Abstract and French article (**Appendices D and F**) and its English translation (**Appendix H**); see [165] - [171].

175.2. Gray, G (Cdr) Bateman, W (LCdr) Clére, J M (Col) et al. 1997, 'Medical Screening of Subjects for Acceleration and Positive Pressure Breathing', *AGARD Advisory Report 352*, AGARD, France, North Atlantic Treaty Organisation, pp. i -ix and 1-37; [110]

175.3. Gawron, VJ 2004, 'The effects of high-G environments on humans', *International Journal of Applied Aviation Studies*, FAA Academy, vol. 4, no. 1, pp. 151-184; [111]

175.4. Chelette, TL 1996, 'Female performance under high-G during fatigue and after G-layoff', *Armstrong Laboratory Wright-Paterson AFB*, Ohio, pp. 1-27. A report for U.S. Army Medical Research and Material Command Fort Detrick, Maryland;[112]

175.5. Welling, DR 2006, 'Military colon and rectal surgery practice', *Clinics in colon and rectal surgery*, vol. 19, no. 3, pp. 134-138; [113]

175.6. Gillingham, KK and Krutz, RW 1974, 'Effects of the abnormal acceleratory environment of flight' (SAM-TR-74-57), School of Aerospace Medicine, Brooks Air Force Base, Texas, p. 39. In Gawron, VJ 2004, 'The effects of high-G environments on humans', *International Journal of Applied Aviation Studies*, FAA Academy, vol. 4, no. 1, pp. 151-184, at p. 163; [114]

---

110 **Appendix G**.

This study concerned 38 voluntary subjects, of whom 15 were civilians (largely Canadian Defence scientists and research assistants or technicians) and 23 military, including 3 military pilots.

The findings include observations of medical occurrences arising from centrifuge exposure in respect of haemorrhoids:

> [a number of subjects] … have commented that high-G experiments have exacerbated hemorrhoids (at p. 8).

However, no actual data is provided, nor are the circumstances of the testing at the time of these occurrences set out in the report.

111 **Appendix G**.

112 **Appendix G.**

This research was conducted in a centrifuge simulator on 8 male and 8 female active military duty subjects. The author provides a small review of literature, and comments without citation or data that:

> Small breaks in the skin capillaries (petechial haemorrhage, or 'G measles') and/or small bruises occasionally appear on the arms, legs, trunk, or buttocks, but these are normally considered to be harmless. Because of the anti-G straining maneuver and inflation of the anti-G protective equipment, subjects will experience increases in both intra-abdominal and intra-thoracic pressure. This increased pressure may cause and/or worsen hernias, hemorrhoids, varicose veins, varicocele, and thrombophlebitis (see at p. 3).

113 **Appendix G**. See footnote 98.

114 **Appendix G**.

175.7. Lutz, S 1971, 'The physical examination for flying'. In Randel, HW (ed), *Aerospace Medicine*, Baltimore, Williams and Wilkins, pp. 442-447; [115]

175.8. MacDougall, JD et al 1993, 'The effects of variations in the anti-G straining maneuver on blood pressure + Gz acceleration', *Aviat Space Environ Med*, vol. 64(2), pp. 126-131; [116]

175.9. Moser, R 1996, 'Additional medical and surgical conditions of aeromedical concern'. In Dehart, RL (ed) *Fundamentals of Aerospace Medicine*, 2nd Edition, Baltimore, Williams and Wilkins, pp. 643-666; [117] and

175.10. Green, NDC 1999, 'Protection against long duration acceleration', pp. 148-156. In Ernsting, J Nicholson, AN Rainford, DJ eds., *Aviation Medicine*, 3rd Edition, Butterworths, London. [118]

176. However, except for Perraud et al 1983 [119] in the new Review Council's view, all of the new information was either:

176.1. not relevant (ie did not touch on) the relevant association;

176.2. not sound medical-scientific evidence; or

---

115 **Appendix G**.

The new Review Council noted a specific reference to haemorrhoids, but the author did not give any data or findings related to a potential association between haemorrhoids and +Gz exposure.

116 **Appendix G**.

This article provides a comprehensive overview of the AGSM, and its underlying physiology and level of protection. It also touches upon the fatiguing nature of the AGSM when performed properly. It notes that:

> The increased intra-abdominal pressure would also cause some compression of the vessels in the abdominal region...

However, it does not mention haemorrhoids, nor does it give any data or information relating to the posited association.

117 **Appendix G**.

This study discussed various issues of aeromedical concern, but again there was no data provided to support the authors' comments. There is a brief discussion of haemorrhoids:

> As in other occupations with prolonged sitting, disruption of sleeping and eating schedules, dehydration, poor nutrition, and similar stresses, flying appears to be particularly associated with haemorrhoids. It also appears possible that exposure to G forces may aggravate any tendency towards this condition (at p. 649).

118 **Appendix G**.

119 See **Appendices D, F, G and H** and see [165] - [171].

176.3. not information which epidemiologists would consider appropriate to take into account (in particular, as no data were provided).

177. While there were a number of papers which assisted an understanding of the impact on the human body of G forces and aircraft flight, [120] and which mentioned haemhorroids, in the new Review Council's view there was nothing in the new information which touched on, or could be found to be capable of 'pointing to,' the relevant association.

178. Despite its exhaustive analysis, the new Review Council remained of the view that a well-constructed prospective study had not been done. [121] In the new Review Council's view, the new information could not potentially meet the reasonable hypothesis test.

RECOMMENDATION

179. Given the new Review Council's:

179.1. views on the strength of biological plausibility;

179.2. analysis of the information available to the RMA at the relevant times; and

179.3. analysis of the new information

the new Review Council recommended that the RMA undertake a new investigation to:

179.4. find out whether there is sound medical-scientific evidence to justify including exposure to:

(a) the effect of 'high G forces'; and/or

(b) the effect of the 'anti-G straining manoeuvre';

as a factor or factors in either or both of Statements of Principles Nos. 41 and 42 of 2008.

180. Given its views on the strength of biological plausibility, the new Review Council was very surprised at the absence of data within the information available to the RMA at the relevant times, and the new information which had been sourced by the Applicant, the Commission, and the new Review Council itself. As mentioned above, the new Review Council was of the view that a well-designed prospective study to date had not been undertaken.

---

120 As there was in the information available to the RMA at the relevant times (**Appendix B**), and in the pool of information (**Appendix A**).

121 See [148] - [154].

181. Accordingly the new Review Council recommended to the RMA that it ask the Secretary of DVA under section 196C(2) of the VEA to carry out research (including any test or experiment) to obtain, confirm, or disprove, specific information about haemorrhoids, including the prevalence of haemorrhoids in the cohort of RAAF fighter jet pilots, and any potential association with:

- the 'effect of high G forces'; and/or
- the effect of the 'anti-G straining manoeuvre'; and

to forward a report to the RMA.

DECISION

182. The new Review Council made the Declarations summarised in [1] and [2] above.

EVIDENCE BEFORE THE COUNCIL

Documents

183. The information considered by the new Review Council (being the information that was available to (before) the RMA at the relevant times and which was sent by the RMA in accordance with section 196K of the VEA) is listed in **Appendix B.** It comprises the 2004 and 2006 information sent by the RMA to the previous Review Council and the 2008 information sent by the RMA to the new Review Council.

184. The information upon which the Applicant and the Commission relied (being information which was available to (before) the RMA and sent to the new Review Council by the RMA in accordance with section 196K of the VEA) is listed in **Appendices C and E** respectively.

185. The information to which the Applicant referred (being information which the RMA advised was 'new information', that is, information which was not available to (not before) the RMA at the relevant times, and so was not considered by the new Review Council in reaching its review decision) is listed in **Appendix D**.

186. The information to which the Commission referred (being information which the RMA advised was new information, that is, information which was not available to (not before) the RMA at the relevant times, and so was not considered by the new Review Council in reaching its review decision) is listed in **Appendix F.**

187. The information which the new Review Council identified (being information which the RMA advised was new information, that is, information which was not available to (not before) the RMA at the relevant times, and so was not considered by the new Review Council in reaching its review decision) is listed in **Appendix G.**

188. The article in French; the abstract in English obtained by the Commission; and the English translation obtained by the new Review Council (subject to the disclaimer in footnote 104) of Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, 'Symptomatologie Hemorroidaire et Pilotes de Chasse' (‘Hemorrhoid symptomatology and fighter pilots’), *Medecine Aeronautique et Spatiale,* tome XXII, pp. 328-332 is at **Appendix H.**

Articles cited in the Council's analysis

of the Information before the RMA

1 Burns, JW 1995, 'G-Protection basis/acceleration physiology'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, pp. 1-10.

2 Burton, RR Leverett, SD Michaelson, ED 1974, 'Man at high sustained +Gz acceleration: a review', *Aerospace Medicine*, vol. 45, no. 10, pp. 1115-1136.

3 Thomson, WHF 1975, 'The nature and cause of haemorrhoids', *Proceedings of the Royal Society of Medicine*, vol. 68, pp. 574-575.

4 Delco, F & Sonnenberg, A 1998, 'Associations between hemorrhoids and other diagnoses', *Diseases of the Colon & Rectum*, vol. 41, pp. 1534-1542.

5 Gibbons, CP Bannister, JJ and Read, NW 1988, 'Role of constipation and anal hypertonia in the pathogenesis of haemorrhoids', *British Journal of Surgery*, vol. 75, pp. 656-660.

6 Hyams, L Philpot, J 1970, 'An epidemiological investigation of hemorrhoids', *Am J Proctol*, vol. 21, pp. 177-193.

7 Kaidar-Person, O Person, B Wexner, SD 2007, 'Hemorrhoidal disease: a comprehensive review', *J Am Coll Surg*, vol. 204, no.1, pp. 102-117.

8 Glaister, DH 1988, 'The effects of long duration acceleration', pp. 139-165. In Ernsting, J & King, P eds., *Aviation Medicine*, Second Edition, Chaps 10, 11, Butterworths, London.

9 Snyder, QC & Kearney, PJ 2002, 'High +Gz induced inguinal herniation in an F-16 aircrew member: case report and review,' *Aviation, Space, and Environmental Medicine,* vol. 73, no. 1, pp. 68-72.

10 Unknown Author 1985, 'Further Significant Medical and Surgical Conditions of Aeromedical Concern, Haemorrhoids', p. 577. In DeHart, RL ed. 1985, *Fundamentals of Aerospace Medicine*, Lea & Febiger, Philadelphia.

11 Unknown Author 1996, Section II: 'Flight Environment Physiology, Vascular Pathology and Pathology Summary', pp. 232, and Unknown Author 1996, Chapter 9: 'Biodynamics: Sustained Acceleration, Anti-G Straining Maneuver (AGSM), Physical Conditioning and Positive Pressure Breathing', pp. 247-250, and Unknown Author Chapter 19: 'Additional Medical and Surgical Conditions of Aeromedical Concern, Irritable Bowel Syndrome and Functional Diarrhea, Inflammatory Bowel Disease, Hemorroids, Other Gastrointestinal Considerations', p. 649. In DeHart, RL ed. 1996, *Fundamentals of Aerospace Medicine*, Williams & Wilkins, Baltimore.

Appendices

Appendix A	Preliminary list of the proposed pool of information, as advised to the Applicant and the Commission by letters dated 6 December 2004 (see [35]), and the final pool of information (see [75]).
Appendix B	Information available to (before) the RMA and sent to the new Review Council by the RMA under section 196K, comprising the 2004 and 2006 information sent to the previous Review Council and the 2008 information sent to the new Review Council.
Appendix C	Information upon which the Applicant relied (being information which was available to (before) the RMA and sent to the new Review Council by the RMA in accordance with section 196K of the VEA).
Appendix D	'New information' that was not available to (not before) the RMA (which the Applicant contended was in existence at the relevant time, and so could have been accessed by the RMA but which was not available to (not before) the RMA at the relevant times, and so was not considered by the new Review Council in reaching its review decision).
Appendix E	Information upon which the Commission relied (being information which was available to (before) the RMA and sent to the new Review Council by the RMA in accordance with section 196K of the VEA).
Appendix F	The information to which the Commission referred (being information which the RMA advised was 'new information', that is, information which was not available to (not before) the RMA at the relevant times, and so was not considered by the new Review Council in reaching its review decision).
Appendix G	The information which the new Review Council identified (being information which the RMA advised was 'new information', that is, information which was not available to (not before) the RMA at the relevant times, and so was not considered by the new Review Council in reaching its review decision).
Appendix H	The article in French; the abstract in English obtained by the Commission; and the English translation obtained by the new Review Council (subject to the disclaimer in footnote 104); of Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, 'Symptomatologie Hemorroidaire et Pilotes de Chasse' (‘Hemorrhoid symptomatology and fighter pilots’), *Medecine Aeronautique et Spatiale,* tome XXII, pp. 328-332.

APPENDIX A

SMRC Folder Numbers	SMRC Article Numbers	RMA ID or Reference Numbers	Title
2	12	18134	Burkitt, DP 1975, ‘Hemorrhoids, varicose veins and deep vein thrombosis: epidemiologic features and suggested causative factors’, *The Canadian Journal of Surgery*, vol. 18, pp. 483-488.
3	3	18264	Burkitt, DP 1976, ‘A deficiency of dietary fiber may be one cause of certain colonic and venous disorders’, *American Journal of Digestive Diseases*, vol. 21, no. 2, pp. 104-108.
3 1	35 10	25217	Burns, JW 1995, 'G-Protection basis/acceleration physiology'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, pp. 1-10.
2	9	8889	Burton, RR Leverett, SD Michaelson, ED 1974, ‘Man at high sustained +Gz acceleration: a review’, *Aerospace Medicine*, vol. 45, no. 10, pp. 1115-1136.
1 3	12 35	40630	Clére, JM, Ossard, G and Kerrguelen, M 1995, ANTI-G SUITS. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 3 pages.
2	27	18149	Delco, F & Sonnenberg, A 1998, ‘Associations between hemorrhoids and other diagnoses’, *Diseases of the Colon & Rectum*, vol. 41, pp. 1534-1542.
2	8	397	Unknown Author 1985, 'Further Significant Medical and Surgical Conditions of Aeromedical Concern, Haemorrhoids', p. 577. In DeHart, RL ed. 1985, *Fundamentals of Aerospace Medicine*, Lea & Febiger, Philadelphia.

2	10	14345	Unknown Author 1996, Section II: 'Flight Environment Physiology, Vascular Pathology and Pathology Summary', pp. 232, and Unknown Author 1996, Chapter 9: 'Biodynamics: Sustained Acceleration, Anti-G Straining Maneuver (AGSM), Physical Conditioning and Positive Pressure Breathing', pp. 247-250, and Unknown Author Chapter 19: 'Additional Medical and Surgical Conditions of Aeromedical Concern, Irritable Bowel Syndrome and Functional Diarrhea, Inflammatory Bowel Disease, Hemorroids, Other Gastrointestinal Considerations', p. 649. In DeHart, RL ed. 1996, *Fundamentals of Aerospace Medicine*, Williams & Wilkins, Baltimore.
2	39	18161	Gibbons, CP Bannister, JJ and Read, NW 1988, 'Role of constipation and anal hypertonia in the pathogenesis of haemorrhoids', *British Journal of Surgery*, vol. 75, pp. 656-660.
2	7	396	Glaister, DH 1988, 'The effects of long duration acceleration', pp. 139-165. In Ernsting, J & King, P eds. *Aviation Medicine*, Second Edition, Chaps 10, 11, Butterworths, London.
2	34	18156	Haas, PA Haas, GP Schmaltz, S Fox, TA Jr. 1983, 'The prevalence of hemorrhoids', *Diseases of the Colon & Rectum*, vol. 26, pp. 435-439.
3	18	18515	Hancock, BD 1977, 'Internal sphincter and the nature of haemorrhoids', *Gut*, vol. 18, pp. 651-655.
3	31	18628	Hyams, L Philpot, J 1970, 'An epidemiological investigation of hemorrhoids', *Am J Proctol*, vol. 21, pp. 177-193.
2	16	18138	Iwatt, AR 1987, 'Epidemiology of haemorrhoids in the adult Nigerian and English: a comparative study', *Central African Journal of Medicine*, vol. 33, no. 3, pp. 61-66.
2 3	23 47	18145 30279	Johanson JF (1997). 'Association of hemorrhoidal disease with diarrheal disorders. Potential pathogenic relationship?', *Diseases of the Colon & Rectum*, vol. 40, pp. 215-219 and discussion pp. 219-221.
2	6	395	Johanson, JF & Sonnenberg, A 1990, 'The prevalence of hemorrhoids and chronic constipation. An Epidemiologic study', *Gastroenterology*, vol. 98, no. 2, pp. 380-386.
4	5	45963	Kaidar-Person, O Person, B Wexner, SD 2007, 'Hemorrhoidal disease: a comprehensive review', *J Am Coll Surg*, vol. 204, no.1, pp. 102-117.

2	33	18155	Loder, PB Kamm, MA Nicholls, RJ and Phillips, RKS 1994, 'Haemorrhoids: pathology, pathophysiology and aetiology', *British Journal of Surgery*, vol. 81, pp. 946-954**.**
4	20	46485	Negri, E Pagano, R Decarli, A La Vecchia, C 1988, 'Body weight and the prevalence of chronic diseases', *Journal of Epidemiology and Community Health*, vol. 42, pp. 24-29**.**
2	24	18146	Polglase, AL 1997, 'Haemorrhoids: a clinical update,' *MJA*, vol. 167, pp. 85-88.
2	2	391	Schrock, TR 1989, 'Examination of the anorectum, rigid sigmoidoscopy, flexible sigmoidoscopy and diseases of the anorectum', pp. 1560-1591. In Sleisenger, MH & Fordtran, JS eds., *Gastrointestinal Disease, Pathophysiology Diagnosis Management*, 4th Edition vol. 2, Chapt 83, WB Saunders Company, Philadephia.
4	13	46230	Seidell, JC de Groot, LCPGM van Sonsbeek, JLA Deurenberg, P and Hautvast, JGAJ 1986, 'Associations of moderate and severe overweight with self-reported illness and medical care in Dutch adults,' *AJPH*, vol. 76, no. 3, pp. 264-269.
3	48	30362	Snyder, QC & Kearney, PJ 2002, 'High +Gz induced inguinal herniation in an F-16 aircrew member: case report and review,' *Aviation, Space, and Environmental Medicine,* vol. 73, no. 1, pp. 68-72.
1 3	11 35	40629	Stupakov, GP & Khomenko, MN 1995, 'Selection and special physiological training of flying personnel to high +Gz-maneuverable flights-main concept'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 7 pages.
1 3	13 35	40631	Stupakov, GP & Khomenko, MN 1995, 'Increase of high-sustained +Gz tolerance at the expense of pilot's working posture change'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 2 pages.

2	5	394	Sun, WM Peck, RJ Shorthouse, AJ and Read, NW 1992, ‘Haemorrhoids are associated not with hypertrophy of the internal anal sphincter, but with hypertension of the anal cushions’, *Br J Surg*, vol. 79, no. 6, pp. 592-594.
2	29	18151	Thomson, WHF 1975, 'The nature and cause of haemorrhoids', *Proceedings of the Royal Society of Medicine*, vol. 68, pp. 574-575.
2	31	18153	Wannas, HR 1984, ‘Pathogenesis and management of prolapsed haemorrhoids’, *Journal of the Royal College of Surgeons of Edinburgh*, vol. 29, no. 1, pp. 31-37.

APPENDIX B

SMRC Folder Numbers	SMRC Article Numbers	RMA ID or Reference Numbers	Title
1	1		Specialist Medical Review Council 2008, SMRC Information List, pp.1-13.
1	2		Repatriation Medical Authority 2008, Cover letter to 19 December information sent under s196K of the VEA, pp. 1-2; with Appendix A - Submissions, p.1 & B – Reference List, pp.1-7.
1	3	1.1	Repatriation Commission 1994, Submission on proposed SoPs, pp. 1-8; and literature search results submitted to the Authority for consideration in the investigation which resulted in SOP Nos. 73 and 74 of 1994, pp. 1-9.
1	4	1.2	Repatriation Medical Authority 5 July 1995 letter to RMA Applicant re: multiple SoPs, p. 1-4; and Name Provided (and removed under s196I of the VEA) 1995, 2 June letter to RMA, pp. 1-5; with Enclosure 6 – VRB Exhibit A a declaration of service, pp. 1-4; and Dept of Defence 1993, 31 May letter and SRC Act 1988 Determination to the 'Name provided', pp. 1-2.
1	5	1.3	Repatriation Medical Authority 10 July 1995 letter to RMA Applicant, p. 1; and Name Provided (and removed under s196I of the VEA) of the RDFWA 5 July 1995 letter to the RMA, pp.1-3; with Enclosures No 1 – Director General of Air Force Health Service record details, p.1; and Enclosure 1 VRB Exhibit A a declaration of service, pp. 1-4; and Dept of Defence 1993, 31 May letter and Enclosure 2 a SRC Act 1988 Determination to the Name Provided (and removed under s196I of the VEA), pp. 1-2.
1	6	1.4	Name Provided (and removed under s196I of the VEA) 1995, [sic 1996] 6 January letter to RMA on Haemorrhoids SoPs 73 & 74 of 1995 and other SoPs, p. 1.

1	7	1.5	Name Provided (and removed under s196I of the VEA) of the RDFWA 1996, 7 March letter on Haemorrhoids to RMA, p. 1; and RMA 1996, 3 January covering letter to Name Provided (and removed under s196I of the VEA), p. 1; with USAF 1995, Memorandum of 8 December to the RMA on Haemorrhoids, USAF School of Aerospace Medicine, Texas, p. 1.
1	8	1.6	United States Airforce 1995, Memorandum of 8 December to RMA on Haemorrhoids, USAF School of Aerospace Medicine, Texas, p. 1; and RMA 10 November 1995 letter to USAF, p. 1.
1	9	1.7	Department of Veterans 1998, The SMACC Unit 23 July letter to RMA; and Name Provided (and removed under s196I of the VEA) of RDFWA 1996, 7 March letter to RMA on Haemorrhoids, p. 1; and RMA 3 January 1996 letter to Name Provided (and removed under s196I of the VEA), p. 1.
1	10	1.8	RAAF 1998, AVMED 24 August memo to RMA listing 4 High G references, p. 1; and Department of Veterans SMACC Unit 1998, 23 July letter to RMA p. 1.
1	11	1.9	Applicant 1 - Name Provided (and removed under s196I of the VEA) 1999, Request to the RMA for review 1 April, p. 1; Repat 10 1995, submission of 30 June to the RMA, pp. 1-3; Enclosure 1 – Director General of Air Force Health Service record details, p.1; and Enclosure 1 VRB Exhibit A a declaration of service, pp. 1-4; and Department of Defence Delegate, 1993, 31 May letter and attached haemorrhoids SRC Act 1988 determination of May 31, 1993, pp. 1-2.
1	12	1.10	Repatriation Medical Authority 2000, Medical researcher 12 May briefing paper for Formal Investigation Haemorrhoids SoPs Nos. 73-74 of 1994, pp. 1-46.
1	13	1.11	Applicant 2 - Name Provided (and removed under s196I of the VEA) 2002, 29 September Request to the RMA for review of Haemorrhoids SoPs No. 14 of 2000 and for review of Gastro-oesophageal SoPs No. 63 of 1999, pp. 1-12; with articles with RMA Nos. 25214 and 25224 and Annexures A to C attached.
1	13	1.11A	Applicant 2 - Name Provided (and removed under s196I of the VEA) 2002, 29 September Annex A List of Aviation Medicine Doctors who can provide additional information, p. 8.

1	13	1.11B	Applicant 2 - Name Provided (and removed under s196I of the VEA) 29 September 2002, Annex B References, pp. 9-12.
1	13	1.11C	Applicant 2 - Name Provided (and removed under s196I of the VEA) 29 September 2002, Annex C Copies of E-mails between Aviation Medicine doctors and [Applicant 2], pp. 1-5; and attachments at 1.11C-1 to 1.11C-16.
1	13	1.11C-1	MacDougall JD et al 1993, [ABSTRACT] 'The effects of variations in the anti-G straining maneuver on blood pressure + Gz acceleration', *Aviat Space Environ Med*, vol. 64(2), pp. 126-131, viewed at PMID: 8431186 [PubMed – indexed for MEDLINE], p. 1.
1	13	1.11C-2	Balldin, UI et al 1985, [ABSTRACT] 'Isometric abdominal muscle training and G tolerance', *Aviat Space Environ Med*, vol. 56(2), pp. 120-124, viewed at PMID: 3157367 [PubMed – indexed for MEDLINE], p. 1.
1	13	1.11C-3	Newman DG (Dr) no date, Specialist Report Application for recognition of medical conditions as Service-related, pp. 1-7; and References, pp. 1-2.
1	13	1.11C-4	Williams, CA et al 1988, [ABSTRACT] 'Effect of different body postures on the pressures generated during an L-1 maneuver', *Aviat Space Environ Med*, vol. 59910, pp. 920-927, viewed at PMID: 3190618 [PubMed – indexed for MEDLINE], p. 1.
1	13	1.11C-5	ThriveOnline Medical Library, Alternative Medicine: Hemorrhoids, p. 1, accessed 30 October 2001, via http://thriveonline.oxygen.com/medical/library/a.../amm0050.htm, p. 1.
1	13	1.11C-6	Quick Care's Self-Care, Hemorrhoids, pp. 1-2, accessed 30 October 2001, via http://www.quickcare.org/gast/hemorrhoids.html, pp. 1 & 2.

1	13	1.11C-7	Zhang, SX Guo, Hz Jing, BS Liu, SF 1992, [ABSTRACT] 'The characteristics of significance of intrathoracic and abdominal pressure during Qigong (Q-C) maneuvering', *Aviat Space Environ Med*, vol. 63, no. 9, pp. 795-801, viewed at PMID: 1524563 [PubMed – indexed for MEDLINE], p. 1.
1	13	1.11C-8	Skinner, DB & Camp, TF 1969, [ABSTRACT REF] 'Effects of increased gravity on gastroesophageal reflux in monkeys,' *Aerospace Medicine*, vol. 40, no.1, pp. 14-17, viewed at PMID: 4973207 [PubMed – indexed for MEDLINE], p. 1.
1	13	1.11C-9	Skinner, DB Camp, TF 1969, [ABSTRACT REF.] 'Measurement of gastroesophageal reflux in the evaluation of hiatus hernia and chest pains in fliers', *Aerospace Medicine*, vol. 40, no. 1, pp. 14-17, viewed at PMID: 6049247 [PubMed – indexed for MEDLINE], p. 1.
1	13	1.11C-10	ThriveOnline Medical Library, n.d., 'Symptoms & conditions: Gastroesophageal reflux disease', (no date for accessing the Library and how access was made is provided), pp. 1-2.
1	13	1.11C-11	Bos, JE Bles, W and de Graaf, B 2002, [ABSTRACT] 'Eye movements to yaw, pitch and roll about vertical and horizontal axes: Adaption and motion sickness,' *Aviat Space Environ Med*, vol. 73, no. 5, pp. 436-444, viewed from ASEM Home Page, p. 1.
1	13	1.11C-12	Smith, SD, 2002, ABSTRACT 'Characterizing the effects of airborne vibration on human body vibration response,' *Aviat Space Environ Med*, vol. 73, no.1, pp. 36-45, viewed from ASEM Home Page, p. 1.
1	13	1.11C-13	Name Provided (and removed under s196I of the VEA) 2001, 17 December Statutory Declaration, p. 1.
1	13	1.11C-14	Lobenko, AA and Vasil'ev, VA 1998, [ABSTRACT-Article in RUSSIAN] 'The efficacy of the early diagnosis of digestive tract diseases in flight personnel', *Lik Sprava*, Mar-Apr (2), pp. 153-155, viewed at PMID: 9670694 [PubMed – indexed for MEDLINE], p. 1.

1	13	1.11C-15	Lobenko, AA Gozhenko, Al and Vasil'ev, VA 1995, [ABSTRACT-Article in RUSSIAN] 'The efficacy of metabolic therapy in chronic gastritis with secretory deficiency in flight personnel', *Lik Sprava*, Sep-Dec (9-12), pp. 175-179, viewed at PMID: 8983771 [PubMed – indexed for MEDLINE], p. 1.
1	13	1.11C-16	Vasil'ev, VA Lobenko, AA and Gozhenko, Al 1996, [ABSTRACT REF-Article in RUSSIAN] 'Early diagnosis of metabolic disorders in the gastric mucosa of flight personnel', *Med Tr Ekol*, no. 3, pp. 38-39, viewed at PMID: 8705145 [PubMed – indexed for MEDLINE], p. 1.
1	14	1.12	Applicant 3 - Name Provided (and removed under s196I of the VEA) 2003, 12 August request to the RMA for review SoPs haemorrhoids; and RMA 2002, 4 October acknowledgement letter to Applicant 2 - Name Provided (and removed under s196I of the VEA), p. 1.
1	15	1.13	Repatriation Medical Authority 2004, Medical researcher 16 April letter to Chair of RMA, p. 1; and briefing paper Formal Investigation Haemorrhoids, pp. 1-10.
1	16	1.14	Applicant 4 - Name Provided (and removed under s196I of the VEA) 2006, 1 November request to the RMA for review of SoPs 26 & 27 of 2004 concerning Haemorrhoids, pp. 1-2; and supporting grounds attached, p. 1; and other information referenced below.
1	16	1.14A	White, P (Dr) 2006, medical report, Yarra Junction Medical Centre, p. 1.
1	16	1.14B	Medinfo, 'Haemorrhoids (Piles) information for patients', accessed on 26/10/2006 via http://www.medinfo.co.uk/conditions/haem,orrhoids.html, pp. 1-3.
1	16	1.14C	Keesey FAQ's, 'Hemorrhoid Disease and the Keesey Treatment', accessed on http://www.nhnatural.com/hemorrhoids.html. pp. 1-2.
1	16	1.14D	Beck, DE no date, 'Gastrointestinal Tract and Abdomen – Benign Rectal, Anal, and Perineal Problems: Introduction', from ACS Surgery Online accessed on 27/10/2006 via http://www.medscape.com/viewarticle/535565, pp. 1, 3, and 4.

1	16	1.14E	GI Tract info, 'Hemorrhoids Symptoms, Piles and Rectal Itching' accessed on 26/10/2006 via http://www.gitract.info/anorectal-problems/hemorrhoids.php, p. 1.
1	16	1.14F	'Hemorrhoids' accessed on 26/10/2006 via http://quickcare.org/gast/hemorrhoids.html, pp. 1-3.
1	17	1.15	Repatriation Medical Authority 2007, 16 January email to a person making a submission to the RMA; and the email from that person - Name Provided (and removed under s196I of the VEA) to the RMA, p. 1.
1	18	3.1	Repatriation Medical Authority Medical Researcher 2008, Investigation into Haemorrhoids for February meeting, pp. 1-18.
1	19	3.2	RMA Medical Researcher 2008, Summary of Issues Haemorrhoids Investigation for February meeting, p. 1.
4	7	45965	Abramowitz, L Sobhani, I Benifla, JL Vuagnat, A et al. 2002, 'Anal Fissure and thrombosed external hemorrhoids before and after delivery', *Dis Colon Rectum*, vol. 45, pp. 650-655.
3	21	18527	Acheson, RM 1960, 'Haemorrhoids in the adult male. A small epidemiological study', *Guy's Hosp Rep*, vol. 109, pp. 184-195.
2	41	18163	Ahmed, ME & Himaida, TI 1990, 'Haemorrhoids in Khartoum', *East African Medical Journal*, vol. 67, no. 1 pp. 48-50.
2	26	18148	Ahmed, SK & Thomson, HJ 1997, 'The effect of breakfast on minor anal complaints: a matched case-control study', *Journal of the Royal College of Surgery Edinburgh*, vol. 42, pp. 331-333.
3	10	18490	Ajayi, OO Banigo, OG and Nnamdi, K 1973, 'Anal fissures, fistulas, abscesses, and hemorrhoids in a tropical population', *Dis Colon & Rectum*, vol. 17, no. 1 pp. 55-60.
3	7	18269	Akande, B & Esho, JO 1989, 'Relationship between haemorrhoids and prostatism: results of a prospective study', *European Urology*, vol. 16, no. 5, pp. 333-334.
4	10	45972	Al-Hadrani, A 2000, 'Khat induced hemorrhoidal disease in Yemen', *Saudi Medical Journal*, vol. 21, no. 5, pp. 475-477.

4	4	45962	Altomare, DF Rinaldi, M La Torre, F and Scardigno, D et al. 2006, 'Red hot chili pepper and hemorrhoids: the explosion of a myth: results of a prospective, randomized, placebo-controlled, crossover trial', *Diseases of the Colon & Rectum*, vol. 49, pp. 1018-1023.
4	8	45966	Arana, E Marti-Bonmati, L Martinez, V Hoyos, M Montes, H 1997, 'Portal vein absence and nodular regenerative hyperplasia of the liver with giant inferior mesenteric vein', *Abdom Imaging*, vol. 22, pp. 506-508.
4	18	46474	Beck, DE 2002, 'Benign rectal anal and perineal problems: introduction', accessed on [no date provided] from http://www.medscape.com/viewarticle/535565.
3	17	18514	Bernstein, WC 1983, 'What are hemorrhoids and what is their relationship to the portal venous system?' *Diseases of the Colon & Rectum*, vol. 26, no. 12, pp. 829-834.
2	36	18158	Bleday, R Pena, JP Rothenberger, DA Goldberg, and SM Buls, JG 1992, 'Symptomatic hemorrhoids: current incidence and complications of operative therapy', *Diseases of the Colon & Rectum*, vol. 35, pp. 477-481.
4	2	45948	Borders, N 2006, 'After the afterbirth: a critical review of postpartum health relative to method of delivery', *J Midwifery Womens Health*, vol. 51, pp. 242-248.
2	25	18147	Buckshee, K Takkar, D Aggarwal, N 1997, 'Micronized flavonoid therapy in internal hemorrhoids of pregnancy', *International Journal of Gynecology & Obstetrics*, vol. 57, pp. 145-151.
2	43	18165	Burkitt, DP & Graham-Stewart, CW 1975, 'Haemorrhoids-postulated pathogenesis and proposed prevention', *Postgraduate Medical Journal*, vol. 51, pp. 631-636.
2	43	18265	Burkitt, DP 1973, 'Varicose veins, deep vein thrombosis, and hemorrhoids', *American Heart Journal*, vol. 85, no. 4 pp. 572-573.
2	12	18134	Burkitt, DP 1975, 'Hemorrhoids, varicose veins and deep vein thrombosis: epidemiologic features and suggested causative factors', *The Canadian Journal of Surgery*, vol. 18, pp. 483-488.

3	3	18264	Burkitt, DP 1976, ‘A deficiency of dietary fiber may be one cause of certain colonic and venous disorders’, *American Journal of Digestive Diseases*, vol. 21, no. 2, pp. 104-108.
3 1	35 10	25217	Burns, JW 1995, 'G-Protection basis/acceleration physiology'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, pp. 1-10.
2	9	8889	Burton, RR Leverett, SD Michaelson, ED 1974, ‘Man at high sustained +Gz acceleration: a review’, *Aerospace Medicine*, vol. 45, no. 10, pp. 1115-1136.
3	14	18511	Chawla, Y Dilawari, JB 1991, ‘Anorectal varices - their frequency in cirrhotic and non-cirrhotic portal hypertension’, *Gut*, vol. 32, pp. 309-311.
1 3	12 35	40630	Clére, JM, Ossard, G and Kerrguelen, M 1995, ANTI-G SUITS. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 3 pages.
4	23	46670	Cohen, Z 1999, ‘An approach to perirectal disease in inflammatory bowel disease’, *Inflammatory Bowel Diseases*, vol. 5, no. 3, pp. 228-230.
2	32	18154	Cosman, BC Eastman, DA Perkash, I and Stone, JM 1994, ‘Hemorrhoidal bleeding in chronic spinal cord injury: results of multiple banding’, *International Journal of Colorectal Diseases*, vol. 9, pp. 174-176.
2	27	18149	Delco, F & Sonnenberg, A 1998, ‘Associations between hemorrhoids and other diagnoses’, *Diseases of the Colon & Rectum*, vol. 41, pp. 1534-1542.
3	6	18268	Dennison, AR Paraskevopoulos, JA Kerrigan, DD and Shorthouse, AJ 1996, ‘New thoughts on the aetiology of haemorrhoids and the development of non-operative methods for their management’, *Minerva Chirurgica*, vol. 51, no. 4, pp. 209-216.
2	22	18144	Elefitheriadis, E & Kotzampassi, K 1997, ‘Portal hypertensive colopathy: a recently recognized entity’, *Endoscopy*, vol. 29, pp. 328-329.

4	14	46373	Faccini, M Zuccon, W Caputo, P Gavezzoli, D et al. 2001, [ABSTRACT Only - Article in Italian]. 'Hemorrhoids: epidemiology and correlation with chronic constipation', *Ann Ital Chir*, vol. 72, no. 3, pp. 337-9, & 340.
2	17	18139	Farouk, R Duthie, GS MacGregor, AB Bartolo, DCC 1994, 'Sustained internal sphincter hypertonia in patients with chronic anal fissure', *Diseases of Colon & Rectum*, vol. 37, pp, 424-429.
3	29	18616	Gabella, G ed. 1995, 'Cardiovascular System, Veins of the abdomen and pelvis', pp. 1598 & 1599 and Bannister, LH ed. 1995, 'Alimentary System, Large Intestine', pp. 1780-1783. In Williams, PL Bannister, LH Berry, MM Collins, P Dyson, M Dussek, JE and Ferguson, MWJ eds. 1995, *Gray's Anatomy, The Anatomical basis of Medicine and Surgery*, 38th edition, Churchill Livingstone.
3	8	18293	Gazet, JC Redding, W and Rickett, JWS 1970, 'The prevalence of haemorrhoids. A preliminary survey', Proceedings of the Royal Society of Medicine, vol. 63, Suppl, pp. 78-80.
2	39	18161	Gibbons, CP Bannister, JJ and Read, NW 1988, 'Role of constipation and anal hypertonia in the pathogenesis of haemorrhoids', *British Journal of Surgery*, vol. 75, pp. 656-660.
3	2	18229	Gjerdingen, DK Froberg, DG Chaloner, KM and McGovern, P 1993, 'Changes in women's physical health during the first postpartum year', *Archives of Family Medicine*, vol. 2, no. 3, pp. 277-283.
2	7	396	Glaister, DH 1988, 'The effects of long duration acceleration', pp. 139-165. In Ernsting, J & King, P eds. *Aviation Medicine*, Second Edition, chaps. 10, 11, Butterworths, London.
4	17	46404	Greenspon, J Williams, SB Young, HA, and Orkin, BA 2004, 'Thrombosed external hemorrhoids: outcome after conservative or surgical management', *Dis Colon Rectum*, vol. 47, pp. 1493-1498.
3	27	18573	Gruis, M 1977, 'Beyond maternity: postpartum concerns of mothers', *MCN American Journal of Maternity Child Nursing*, vol. 2, pp. 182-188.

2	40	18162	Haas, PA & Haas, GP 1990, 'The prevalence of hemorrhoids and chronic constipation', *Gasteroenterology*, vol. 99, no. 60, pp. 1856-1857.
2	37	18159	Haas, PA 1992, 'The prevalence of confusion in the definition of hemorrhoids', *Diseases of the Colon & Rectum*, vol. 35, no. 3, pp. 290-291.
2	34	18156	Haas, PA Haas, GP Schmaltz, and S Fox, TA Jr. 1983, 'The prevalence of hemorrhoids', *Diseases of the Colon & Rectum*, vol. 26, pp. 435-439.
3	20	18517	Hamlyn, AN Morris, JS Lunzer, MR and Puritz, H 1974, 'Portal hypertension with varices in unusual sites', *The Lancet*, vol. 2, pp. 1531-1534.
3	18	18515	Hancock, BD 1977, 'Internal sphincter and the nature of haemorrhoids', *Gut*, vol. 18, pp. 651-655.
3	22	18528	Harrison, MJ & Hicks, SA 1983, 'Postpartum concerns of mothers and their sources of help', *Canadian Journal of Public Health*, vol. 74, pp. 325-328.
3	1	18228	Heaton, ND Davenport, M and Howard, ER 1992, 'Symptomatic hemorrhoids and anorectal varices in children with portal hypertension', *Journal of Pediatric Surgery*, vol. 27, no. 7, pp. 833-835.
2	15	18137	Heaton, ND Davenport, M and Howard, ER 1993, 'Incidence of haemorrhoids and anorectal varices in children with portal hypertension', *British Journal of Surgery*, vol. 80, pp. 616-618.
3	49	30978	Hicks, T 1997, 'Invited editorial: Association of hemorrhoidal disease with diarrheal disorders', *Dis Colon Rectum,* vol. 40, pp. 219-220.
3	11	18508	Hosking, SW & Johnson, AG 1988, 'Bleeding anorectal varices - a misunderstood condition', *Surgery*, vol. 104, no. 1, pp. 70-73.
3	19	18516	Hosking, SW Johnson, AG Smart, HL and Triger, DR 1989, 'Anorectal varices, haemorrhoids, and portal hypertension', *The Lancet*, vol. 1, pp. 349-352.
3	31	18628	Hyams, L & Philpot, J 1970, 'An epidemiological investigation of hemorrhoids', *Am J Proctol*, vol. 21, pp. 177-193.

2	16	18138	Iwatt, AR 1987, ‘Epidemiology of haemorrhoids in the adult Nigerian and English: a comparative study', *Central African Journal of Medicine*, vol. 33, no. 3, pp. 61-66.
2	20	18142	Jacobs, DM Bubrick, MP Onstad, GR and Hitchcock, CR 1980, ‘The relationship of hemorrhoids to portal hypertension’, *Diseases of the Colon & Rectum*, vol. 23, pp. 567-9.
3	28	18577	Johansen, K Bardin, J and Orloff, MJ 1980, ‘Massive bleeding from hemorrhoidal varices in portal hypertension’, *JAMA*, vol. 244, pp. 2084-2085.
2 3	23 47	18145 30279	Johanson JF (1997). 'Association of hemorrhoidal disease with diarrheal disorders. Potential pathogenic relationship?’, *Diseases of the Colon & Rectum*, vol. 40, pp. 215-219 and discussion pp. 219-221.
2	6	395	Johanson, JF & Sonnenberg, A 1990, ‘The prevalence of hemorrhoids and chronic constipation. An Epidemiologic study’, *Gastroenterology*, vol. 98, no. 2, pp. 380-386.
3	38	18160	Johanson, JF & Sonnenberg, A 1991, ‘Temporal changes in the occurrence of hemorrhoids in the United States and England’, *Diseases of the Colon & Rectum*, vol. 34, pp. 585-593.
2	44	18175	Johanson, JF & Sonnenberg, A 1994, ‘Constipation is not a risk factor for hemorrhoids: a case-control study of potential etiological agents’, *The American Journal of Gastroenterology*, vol. 89, no. 11, pp. 1981-1986.
4	5	45963	Kaidar-Person, O Person, B and Wexner, SD 2007, ‘Hemorrhoidal disease: a comprehensive review’, *J Am Coll Surg*, vol. 204, no. 1, pp. 102-117.
3	24	18567	Keighley, MRB Buchmann, P Minervini, S Arabi, Y and Alexander-Williams, J 1979, ‘Prospective trials of minor surgical procedures and high-fibre diet for haemorrhoids’, *British Medical Journal*, vol. 2, pp. 967-969.
3	50	31671	Leibovici, D Zisman, A Siegel, YI and Lindner, A 2001, ‘Cryosurgical ablation for prostate cancer: preliminary results of a new advanced technique’, *Isr Med Assoc J*, vol. 3, no. 7, pp. 484-487.

3	40	25222	Leino, T 1999, 'Neuroedocrine Responses to Psychological Workload of Military flying', Depts of Physiology and Clincial Chemistry, Biocenter Oulu, University ou Oulu, Abstract plus pp. 62-68.
3	42	25224	Leino, TK & Ruokonen, A 1998, 'Pro-Opiomelanocortin Activation and Simulated Interceptor Combat Flight', *Aviation, Space, and Environmental Medicine,* vol. 69, no. 5, pp. 486-490.
3	41	25223	Leino, TK & Ruokonen, A 1999, 'Neuroendocrine Responses to Psychological Workload of Instrument Flying in Student Pilots', *Aviation, Space, and Environmental Medicine*, vol. 70, no. 6, pp. 565-570.
2	33	18155	Loder, PB Kamm, MA Nicholls, RJ and Phillips, RKS 1994, 'Haemorrhoids: pathology, pathophysiology and aetiology', *British Journal of Surgery*, vol. 81, pp. 946-954**.**
2	14	18136	MacArthur, C Lewis, M and Knox, EG 1991, 'Health after childbirth', *British Journal of Obstetrics and Gynaecology*, vol. 98, pp. 1193-1195.
2	19	18141	Malde, H Nagral, A Shah, P Joshi, MS Bhatia, SJ and Abraham, P 1993, 'Detection of rectal and pararectal varices in patients with portal hypertension: efficacy of transvaginal sonography', *American Journal of Roenterology*, vol. 161, pp. 335-337.
3	51	31672	Matzkin, H 2001, 'Freezing the prostate', *Isr Med Assoc J*, vol. 3, no. 7, p 535.
4	19	46484	McClane, SJ & Rombeau, JL 2001, 'Anorectal Crohn's disease', *Surgical Clinics of North America*, vol. 81, no. 1, pp. 169-183.
3	12	18509	McCormack, TT Bailey, HR Simms, JM and Johnson, AG 1984, 'Rectal varices are not piles', *British Journal of Surgery*, vol. 171, p. 163.
2	45	18202	McGivney, J 1967, 'A re-evaluation of etiologic factors of hemorrhoidal disease', *Arizona Medicine*, vol. 24, no. 4, pp. 333-336.
3	44	30003	Metcalfe, C Davey Smith, G Macleod, J Heslop, P and Hart, C 2003, 'Self-reported stress and subsequent hospital admissions as a result of hypertension, varicose veins and haemorrhoids', *J Public Health Med,* March, vol. 25, no. 1, pp. 62-68.

2	21	18143	Misra, SP Dwivedi, M and Misra, V 1996, 'Prevalence and factors influencing hemorrhoids, anorectal varices, and colopathy in patients with portal hypertension', *Endoscopy*, vol. 28, pp. 340-345.
3	25	18568	Moesgaard, F Nielsen, ML Hansen, JB and Knudsen, JT 1982, 'High-fibre diet reduces bleeding and pain in patients with hemorrhoids. A double-blind trial of visiblin', *Diseases of Colon & Rectum*, vol. 25, pp. 454-456.
4	20	46485	Negri, E Pagano, R Decarli, A and La Vecchia, C 1988, 'Body weight and the prevalence of chronic diseases', *Journal of Epidemiology and Community Health*, vol. 42, pp. 24-29.
2	35	18157	Nelson, RI & Persky, V 1994, 'The rise and fall of colorectal cancer', *Diseases of the Colon & Rectum*, vol. 38, no. 11, pp. 1175-1177.
4	16	46403	Nelson, RL Abcarian, H Davis, FG and Persky, V 1995, 'Prevalence of benign anorectal disease in a randomly selected population', *Diseases of the Colon & Rectum*, vol. 38, pp. 341-344.
2	42	18164	Ogendo, SWO. 1991, 'A study of haemorrhoids as seen at the Kenyatta National Hospital with special reference to asymptomatic haemorrhoids', *East African Medical Journal*, vol. 68, no. 5, pp. 340-347.
3	34	25216	Ohslund, RK Dalton, CI Reams, GG Rose, JW and Oswald, RE eds 1991, 'G-Induced Loss of Consciousness (G-Loc)', 3 pages. *United States Naval Flight Surgeon's Manual*, Third edn. chap 7, Neurology, Naval Areospace Medicine Institute, accessed on 14/04/2002 at http://www.vnh.org/FSManual/07/06GInduced.html.
3	38	25220	Ohslund, RK Dalton, CI Reams, GG Rose, JW and Oswald, RE eds 1991, 'Vibration', 3 pages. In *United States Naval Flight Surgeon's Manual*, Third edn. chap 2, Acceleration and Vibration, Naval Areospace Medicine Institute, accessed on (no date provided) at www.vhn.org/FSManual/02/04/vibration.

3	37	25219	Ohslund, RK Dalton, CI Reams, GG Rose, JW and Oswald, RE eds. 1991, 'Esophogeal Reflux and Hiatal Hernia', 2 pages. In *United States Naval Flight Surgeon's Manual*, Third edn. Chapt 5, 'Internal Medicine', Section II, 'Gastroenterology', Virtual Naval Hospital, Naval Aerospace Medicine Institute, accessed on 14/04/2002 at http:/www.vnh.org/FSManual/05/02aEsophagealReflux.html.
3	43	30002	Orlay, G 2003, 'Haemorrhoids-a review', *Australian Family Physician*, vol. 32, no. 7, pp. 523-526.
4	15	46402	Parangi, S Levine, D Henry, A Isakovich, N and Pories, S 2007, 'Surgical gastrointestinal disorders during pregnancy', *Am J Surg*, vol. 193, pp. 223-232.
4	21	46668	Pavone, C Caldarera, E Liberti, P Miceli, V et al. 2000, 'Correlation between chronic prostatitis syndrome and pelvic venous disease. A survey of 2,554 urologic outpatients', *Eur Urol*, vol. 37, no. 4, pp. 400-403.
4	11	46200	Pigot, F Siproudhis, L and Allaert, F-A 2005, 'Risk factors associated with hemorrhoidal symptoms in specialized consultation', *Gastroenterl Clin Biol*, vol. 29, pp. 1270-1274.
2	24	18146	Polglase, AL. 1997, 'Haemorrhoids: a clinical update', *MJA*, vol. 167, pp. 85-88.
3	5	18267	Prasad, GC Prakash, V Tandon, AK Deshpande, PJ 1976, 'Studies on etiopathogenesis of hemorrhoids', *American Journal of Proctology*, vol. 27, no. 3, pp. 33-41.
4	22	46669	Present, DH & Banks, PA 1999, 'Diagnosing (and managing) perianal complications of Crohn's disease', *Inflammatory Bowel Diseases*, vol. 5, no. 3, p. 234.
3	15	18512	Rabinovitz, M Schade, RR Dindzans, VJ Belle, SH Van Thiel, DH and Gavaler, JS 1990, 'Colonic disease in cirrhosis. An endoscopic evaluation in 412 patients', *Gastroenterology,* vol. 99, no. 1, pp. 195-199.
3	39	25221	Reinhart, RO 1999, Stress Management, Crew Resource Management and the Safe Crewmember, chap. 9, *Fit for Flight, Flight, Physiology and Human Factors for Aircrew*, Second edn, Iowa State University Press, Ames, pp. vi-vii and 193-198.

3	45	30004	Rohde, H & Alexander-Williams, J 2000, [LETTERS]
3	46	30117	'Routine anal cleansing, so-called hemorrhoids, and perianal dermatitis: cause and effect?', *Dis Colon Rectum*, vol. 43, no. 4, pp. 561-563.
2	2	391	Schrock, TR 1989, 'Examination of the anorectum, rigid sigmoidoscopy, flexible sigmoidoscopy and diseases of the anorectum', pp. 1560-1591. In Sleisenger, MH & Fordtran, JS eds., *Gastrointestinal Disease, Pathophysiology Diagnosis Management*, 4th Edition vol. 2, Chapt 83, WB Saunders Company, Philadephia.
4	6	45964	Scott, D Papa, MZ Sareli, M Velano, A et al. 2002, 'Management of hemorrhoidal disease in patients with chronic spindal cord injury', *Tech Coloproctol*, vol. 6, pp. 19-22.
4	13	46230	Seidell, JC de Groot, LCPGM van Sonsbeek, JLA Deurenberg, P and Hautvast, JGAJ 1986, 'Associations of moderate and severe overweight with self-reported illness and medical care in Dutch adults', *AJPH*, vol. 76. no. 3, pp. 264-269.
2	30	18152	Shafik, A 1984, 'The pathogenesis of hemorrhoids and their treatment by anorectal bandotomy', *Journal of Clinical Gastroenterology*, vol. 6, pp. 129-137.
4	3	45949	Sielezneff, AK Lecuyer, J Saisse, J et al. 1998, 'Y a-t-il une corrélation entre les habitudes alimentaires et la maladie hémorroïdaire?', *Presse Med*, vol. 27, pp. 513-517
4	1	45074	Signorello, LB Tzonou, A Lagiou, P Samoli, E Zavitsanos, X and Trichopoulos, D 1999, 'The epidemiology of benign prostatic hyperplasia: a study in Greece', *BJU International*, vol. 84, no. 3, pp. 286-291.
3	30	18627	Simmons, SC 1972, 'Anorectal disorders in pregnancy',
2	28	18150	*Proc Royal Society Medicine*, vol. 65, p. 286.
3	48	30362	Snyder, QC & Kearney, PJ. 2002, 'High +Gz induced inguinal herniation in an F-16 aircrew member: case report and review', *Aviation, Space, and Environmental Medicine,* vol. 73, no. 1, pp. 68-72.
3	23	18563	Stone, JM Nino-Murcia, M Wolfe, VA and Perkash, I 1990, 'Chronic gastrointestinal problems in spinal cord injury patients: a prospective analysis', *The American Journal of Gastroenterology*, vol. 85, no. 9, pp. 1114-1119.

4	24	46671	Strong, SA 2007, 'Perianal Crohn's disease', *Seminars in Pediatric Surgery*, vol. 16, pp. 185-193.
1 3	13 35	40631	Stupakov, GP & Khomenko, MN 1995, 'Increase of high-sustained +Gz tolerance at the expense of pilot's working posture change'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 2 pages.
1 3	11 35	40629	Stupakov, GP & Khomenko, MN 1995, 'Selection and special physiological training of flying personnel to high +Gz-maneuverable flights-main concept'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 7 pages.
2	5	394	Sun, WM Peck, RJ Shorthouse, AJ and Read, NW 1992, 'Haemorrhoids are associated not with hypertrophy of the internal anal sphincter, but with hypertension of the anal cushions', *Br J Surg*, vol. 79, no. 6, pp. 592-594.
2	29	18151	Thomson, WHF 1975, 'The nature and cause of haemorrhoids', Proceedings of the Royal Society of Medicine, vol. 68, pp. 574-575.
4	12	46229	Thornton, SC 2007, 'Hemorrhoids', 16 pages, accessed on (no date) at http://www.emedicine.com/med/topic2821.htm.
3	9	18312	Thulesius, O & Gjores, JE 1973, 'Arterio-venous anastomoses in the anal region with reference to the pathogenesis and treatment of haemorrhoids', *Acta Chirurgica Scandinavica*, vol. 139, no. 5, pp. 476-478.
2	4	393	Titus, JL & Han-Seob, K 1990, 'Eosphageal varices, Hemorrhoids, Varicoceles, Phlebothrombosis and Thrombophlebetis', p. 788. In Kissane, JM ed. 1990, *Anderson's Pathology*, 9th edn., vol. 1, CV Mosby Company, St Louis.
2	8	397	Unknown Author 1985, 'Further Significant Medical and Surgical Conditions of Aeromedical Concern, Haemorrhoids', p. 577. In DeHart, RL ed. 1985, *Fundamentals of Aerospace Medicine*, Lea & Febiger, Philadelphia.

2	1	390	Unknown Author 1992, 'The Anus and Anal Canal', pp. 1240-1275. In Mann, CV & Russell, RCG eds. 1992, *Bailey & Love's Short Practice of Surgery,* 21st Edition, chapt 53, Chapman & Hall Medical, London.
2	10+	14345	Unknown Author 1996, Section II: 'Flight Environment Physiology, Vascular Pathology and Pathology Summary', pp. 232, and Unknown Author 1996, Chapter 9: 'Biodynamics: Sustained Acceleration, Anti-G Straining Maneuver (AGSM), Physical Conditioning and Positive Pressure Breathing', pp. 247-250, and Unknown Author Chapter 19: 'Additional Medical and Surgical Conditions of Aeromedical Concern, Irritable Bowel Syndrome and Functional Diarrhea, Inflammatory Bowel Disease, Hemorroids, Other Gastrointestinal Considerations', p. 649. In DeHart, RL ed. 1996, *Fundamentals of Aerospace Medicine*, Williams & Wilkins, Baltimore.
3	36	25218	Unknown Author 1999, 'Gastrointestinal System', 4 pages. In *Hospital Corpsman Sickcall Screeners Handbook*, Naval Hospital, Great Lakes, Virtual Naval Hospital, The Brookside Associates Medical Education Division web version accessed on 14/04/2002 at http:/www.vnh.org/SickcallScreeners/Gastrointestinal System.html.
2	3	392	Unknown Author no date, 'Diseases of the small and large intestine', pp.1423-1424. In Isselbacher, KJ Braunwald, EAB Wilson, JD Martin, JB Fauci AS and Kasper DL eds. 1994, *Harrison's Principles of Internal Medicine*, 13th Edition, chap 256, McGraw-Hill.
2	11	14346	Unknown Author, no date, 'Colon, Rectum, and Anus, Hemorrhoids', p. 1222. In Schwartz, SI ed. 1984, *Principles of Surgery*, 4th edn, chap. 28, McGraw Hill Book Company, New York.
4	25	46734	Usai, E Scarpa, RM De Lisa, A and Porru, D 1995, ‘Benign prostatic hyperplasia: associated pathology’, *J Urol (Paris)*, vol. 101, no. 1, pp. 53-54.
4	9	45971	Wald, A 2003, ‘Constipation, diarrhea, and symptomatic hemorrhoids during pregnancy’, *Gastroentrol Clin N Am*, vol. 32, pp. 309-322.

2	18	18140	Wang, T-F Lee, F-Y Tsai, Y-T Lee, S-D Wang, S-S Hsia, H-C Lin, W-J Lai, K-H Chan, C-Y and Lo K-J 1992, 'Relationship of portal pressure, anorectal varices and hemorrhoids in cirrhotic patients', *Journal of Hepatology*, vol. 15, pp. 170-173.
2	31	18153	Wannas, HR 1984, 'Pathogenesis and management of prolapsed haemorrhoids', *Journal of the Royal College of Surgeons of Edinburgh*, vol. 29, no. 1, pp. 31-37.
3	32	25214	Watson, D 1990, 'G-Loc, Could it happen to you?', 7 pages accessed on (no date) at http://areomedical.org/Artilce/g-loc.html and originally published in the *AOPA (Australia) Magazine*, vol. 43, no 8, August 1990.
2	13	18135	Watts, GT 1986, 'Piles are caused by varicose veins in the anal canal', *The Lancet*, vol. 1, no. 8473, pp. 144-145.
2	26	18569	Webster, DJT Gough, DCS Craven, JL 1978, 'The use of bulk evacuant in patients with haemorrhoids', *British Journal of Surgery*, vol. 65, pp. 291-292.
3	16	18513	Weinshel, E Chen, W Falkenstein, DB Kessler, R and Raicht, RF 1986, 'Hemorrhoids or rectal varices: defining the cause of massive rectal hemorrhage in patients with portal hypertension', *Gasteroenterology*, vol. 90, pp. 744-747.
3	13	18510	Wilson, SE Stone, RT Chrisite, JP Passaro, E Jr 1979, 'Massive lower gastrointestinal bleeding from intestinal varices', *Arch Surg*, vol. 114, pp. 1158-1161.
3	33	25215	Winter, BJ 1998, 'G-Tolerance training: Methods, capabilities, and new developments', 4 pages, accessed on (no date) at Aerospace Medicine home page (http://www.etcaircrewtraining.com/ats_tolerance.htm).

APPENDIX C

SMRC Folder Numbers	SMRC Article Numbers	RMA ID or Reference Numbers	Title
2	12	18134	Burkitt, DP 1975, ‘Hemorrhoids, varicose veins and deep vein thrombosis: epidemiologic features and suggested causative factors’, *The Canadian Journal of Surgery*, vol. 18, pp. 483-488.
2	9	8889	Burton, RR Leverett, SD Michaelson, ED 1974, ‘Man at high sustained +Gz acceleration: a review’, *Aerospace Medicine*, vol. 45, no. 10, pp. 1115-1136.
3	6	18268	Dennison, AR Paraskevopoulos, JA Kerrigan, DD and Shorthouse, AJ 1996, ‘New thoughts on the aetiology of haemorrhoids and the development of non-operative methods for their management’, *Minerva Chirurgica*, vol. 51, no. 4, pp. 209-216.
2	7	00396	Glaister, DH 1988, 'The effects of long duration acceleration', pp. 139-165. In Ernsting, J & King, P eds. *Aviation Medicine*, Second Edition, chaps. 10, 11, Butterworths, London.
2	24	18146	Polglase, AL. 1997, ‘Haemorrhoids: a clinical update’, *MJA*, vol. 167, pp. 85-88.
2	8	00397	Unknown Author 1985, 'Further Significant Medical and Surgical Conditions of Aeromedical Concern, Haemorrhoids', p. 577. In DeHart, RL ed. 1985, *Fundamentals of Aerospace Medicine*, Lea & Febiger, Philadelphia.
2	10	14345	Unknown Author 1996, Section II: 'Flight Environment Physiology, Vascular Pathology and Pathology Summary', pp. 232, and Unknown Author 1996, Chapter 9: 'Biodynamics: Sustained Acceleration, Anti-G Straining Maneuver (AGSM), Physical Conditioning and Positive Pressure Breathing', pp. 247-250, and Unknown Author Chapter 19: 'Additional Medical and Surgical Conditions of Aeromedical Concern, Irritable Bowel Syndrome and Functional Diarrhea, Inflammatory Bowel Disease, Hemorroids, Other Gastrointestinal Considerations', p. 649. In DeHart, RL ed. 1996, *Fundamentals of Aerospace Medicine*, Williams & Wilkins, Baltimore.

APPENDIX D

SMRC Folder	SMRC Article Numbers	RMA ID or Reference	Title
E	25		Civil Aviation Safety Authority 2005, Medical Examiner's Handbook, v3.2 January, Haemorrhoids section 2.9.19, accessed by SMRC on 8 December 2006 via http://www.casa.gov.au/manuals/regulate/dame/index.htm , pp. 1-16.
E	27		Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, [English ABSTRACT] 'Hemorrhoid symptomatology and fighter pilots,' *Medecine Aeronautique et Spatiale*, vol. 22, p. 1.

APPENDIX E

SMRC Folder Numbers	SMRC Article Numbers	RMA ID or Reference Numbers	Title
3	35	25217	Burns, JW 1995, 'G-Protection basis/acceleration physiology'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, pp. 1-10.
3	35	40630	Clére, JM, Ossard, G and Kerrguelen, M 1995, ANTI-G SUITS. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 3 pages.
2	33	18155	Loder, PB Kamm, MA Nicholls, RJ and Phillips, RKS 1994, 'Haemorrhoids: pathology, pathophysiology and aetiology', *British Journal of Surgery*, vol. 81, pp. 946-954**.**
2	2	391	Schrock, TR 1989, 'Examination of the anorectum, rigid sigmoidoscopy, flexible sigmoidoscopy and diseases of the anorectum', pp. 1560-1591. In Sleisenger, MH & Fordtran, JS eds., *Gastrointestinal Disease, Pathophysiology Diagnosis Management*, 4th Edition vol. 2, Chapt 83, WB Saunders Company, Philadephia.
3	35	40629	Schrock, TR 1989, 'Examination of the anorectum, rigid sigmoidoscopy, flexible sigmoidoscopy and diseases of the anorectum', pp. 1560-1591. In Sleisenger, MH & Fordtran, JS eds., *Gastrointestinal Disease, Pathophysiology Diagnosis Management*, 4th Edition vol. 2, Chapt 83, WB Saunders Company, Philadephia.
3	35	40631	Stupakov, GP & Khomenko, MN 1995, 'Increase of high-sustained +Gz tolerance at the expense of pilot's working posture change'. In AGARD (Advisory Group for Aerospace Research & Development) Lecture Series No 202, *Current Concepts on G-Protection Research and Development*, North Atlantic Treaty Organisation, Paris, 2 pages.

2	8	397	Unknown Author 1985, 'Further Significant Medical and Surgical Conditions of Aeromedical Concern, Haemorrhoids', p. 577. In DeHart, RL ed. 1985, *Fundamentals of Aerospace Medicine*, Lea & Febiger, Philadelphia.
2	10	14345	Unknown Author 1996, Section II: 'Flight Environment Physiology, Vascular Pathology and Pathology Summary', pp. 232, and Unknown Author 1996, Chapter 9: 'Biodynamics: Sustained Acceleration, Anti-G Straining Maneuver (AGSM), Physical Conditioning and Positive Pressure Breathing', pp. 247-250, and Unknown Author Chapter 19: 'Additional Medical and Surgical Conditions of Aeromedical Concern, Irritable Bowel Syndrome and Functional Diarrhea, Inflammatory Bowel Disease, Hemorroids, Other Gastrointestinal Considerations', p. 649. In DeHart, RL ed. 1996, *Fundamentals of Aerospace Medicine*, Williams & Wilkins, Baltimore.

APPENDIX F

SMRC Folder	SMRC Article Numbers	RMA ID or Reference	Title
E	26		Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, [Article in FRENCH] 'Symptomatologie Hemorrhoidaire et Pilotes de Chasse,' *Medecine Aeronautique et Spatiale,* tome XXII, pp. 328-332.
E	27		Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, [English ABSTRACT] 'Hemorrhoid symptomatology and fighter pilots,' *Medecine Aeronautique et Spatiale,* vol. 22, p. 1.

APPENDIX G

SMRC Folder	SMRC Article Numbers	RMA ID or Reference	Title
E	1		Specialist Medical Review Council 2010, SMRC New Information List, pp.1-2.
E	17		Air Transport Association of America 1994, *Airline cabin quality study*, Washington, DC, Consolidated Safety Services Inc, pp. 1-43.
E	4		Bos, JE Bles, W and de Graaf, B 2002, 'Eye movements to yaw, pitch and roll about vertical and horizontal axes: Adaption and motion sickness,' *Aviat Space Environ Med*, vol. 73, no. 5, pp. 436-444.
			Brook WH 1990, 'The development of the Australian anti-G suit', *Aviat Space Environ Med*, vol. 61, pp. 176-182.
			Buick, F Hartley, J and Pecaric, M 1992, 'Maximum intra-thoracic pressure with anti-G straining maneuvers and positive pressure breathing during +Gz', *Aviat Space Environ Med*, August, vol. 63, no. 8, pp. 670-677.
			Burns, JW Balldin, UI 1988, 'Assisted positive pressure breathing for augmentation of acceleration tolerance time', *Aviat Space Environ Med*, March, vol. 59, no. 3, pp. 225-233.
			Burns, JW 1988, 'Prevention of loss of consciousness with positive pressure breathing and supinating seat', *Aviat Space Environ Med*, January, vol. 59, no. 1, pp. 20-22.
			Burton, RR & Whinnery, JE 1996, 'Biodynamics: sustained acceleration', pp. 201-260. In DeHart. RL ed. *Fundamentals of aerospace medicine*, Baltimore, Williams and Wilkins.
E	31		Chelette, TL 1996, 'Female performance under high-G during fatigue and after G-layoff', *Armstrong Laboratory Wright-Paterson AFB*, Ohio, pp. 1-27. A report for U.S. Army Medical Research and Material Command Fort Detrick, Maryland.

Cornwall, MW Krock, LP and Wagner, LM 1994, ‘Muscular fatigue and recovery following alternating isometric contractions at different levels of force’, *Aviat Space Environ Med*, vol. 65, pp. 309-314.

E 33 Dorlands Medical Dictionary Online, ‘hem or rhoid’ re-accessed on 24 October 2006, originally accessed on 8 and 17 March 2004 but no copy retained within the RMA’s records. http://www.dorlands.com/def.jsp?id=12416080, p. 1.

E 30 Gawron, VJ 2004, ‘The effects of high-G environments on humans', *International Journal of Applied Aviation Studies*, FAA Academy, vol. 4, no. 1, pp. 151-184.

Gillingham, KK & Krutz, RW 1974, ‘Effects of the abnormal acceleratory environment of flight’ (SAM-TR-74-57), School of Aerospace Medicine, Brooks Air Force Base, Texas, p. 39. In Gawron, VJ 2004, ‘The effects of high-G environments on humans', *International Journal of Applied Aviation Studies*, FAA Academy, vol. 4, no. 1, pp. 151-184, at p. 163.

Glaister, DH & Prior, ARJ 1999, ‘The effects of long duration acceleration', pp. 128-147. In Ernsting, J Nicholson, AN and Rainford, DJ eds. *Aviation Medicine*, 3rd edn, Butterworths, London.

E 29 Gray, G (Cdr) Bateman, W (LCdr) Clére, JM (Col) et al. 1997, ‘Medical Screening of Subjects for Acceleration and Positive Pressure Breathing', *AGARD Advisory Report 352*, AGARD, France, North Atlantic Treaty Organisation, pp. i-ix and 1-37.

Green ND, & Ford SA 2006, ‘G-induced loss of consciousness: retrospective survey results from 2259 military aircrew’, *Aviat Space Environ Med*, June, vol. 77, no. 6, pp. 619-623.

E 6 Green, NDC 1999, 'Protection against long duration acceleration', pp. 148-156. In Ernsting, J Nicholson, AN Rainford, DJ eds., *Aviation Medicine*, 3rd Edition, Butterworths, London.

E	18	Kickpatrick, CT 1988, 'Thermal physiology', pp. 235-246. In Ernsting, J and King, P eds., *Aviation Medicine*, 2nd Edition, Butterworths, London.
E	7	Lindgren, T et al 2000, 'Cabin environment and protection of cabin air quality among commercial aircrew', *Aviat Space Environ Med*, vol. 71, pp. 774-782.
E	8	Lutz, S 1971, 'The physical examination for flying', pp. 442-447. In Randel, HW ed., *Aerospace Medicine*, Baltimore, Williams and Wilkins.
E	2	MacDougall, JD et al 1993, 'The effects of variations in the anti-G straining maneuver on blood pressure + Gz acceleration', *Aviat Space Environ Med*, vol. 64, no. 2, pp. 126-131.
E	19	Moser, R 1996, 'Additional medical and surgical conditions of aeromedical concern', pp. 643-666. In Dehart, RL ed *Fundamentals of Aerospace Medicine*, 2nd Edition, Baltimore, Williams and Wilkins.
E	20	Nadga, NL & Hodgson, M 2001, 'Low relative humidity and aircraft air quality', *Indoor Air*, pp. 200-214.
E	9	Nadga, NL et al, 1992, 'Measurement of cabin air quality aboard commercial airliners', *Atmospheric Environ*, pp. 2203-2210.
E	13	Newman, DG 1996, 'Protecting tomorrow's fighter pilot: advanced technology G suits', *Aust Mil Med*, vol. 5, pp. 9-11.
		Newman, DG 1997, '+Gz-induced neck injuries in Royal Australian Air Force fighter pilots', *Aviat Space Environ Med*, vol. 68, pp. 520-524.
E	12	Newman, DG 1998, 'Motion sickness I: neurophysiologic aspects', *Avmedia*, vol. 22, pp. 16-21.
E	11	Newman, DG 1999, 'Motion sickness II: susceptibility and treatment', *Avmedia*, vol. 23, pp. 15-22.
E	10	Newman, DG & Callister, R 1999, 'Analysis of the Gz environment during air combat maneuvering in the F/A-18 fighter aircraft', *Aviat Space Environ Med*, pp. 310-315.

Newman, DG & Callister, R 2008, 'Cardiovascular training effects in fighter pilots induced by occupational high G exposure', *Aviat Space Environ Med,* vol. 79, pp. 774-778.

E 21 Nunneley, SA 1996, 'Thermal Stress', pp. 399-422. In DeHart, RL ed., *Fundamentals of Aerospace Medicine*, 2nd Edition, Baltimore, Williams and Wilkins.

E 14 O'Donnell, A Donini, G and Nguyen, VH 1991, 'Air quality ventilation temperature and humidity in aircraft', *ASHRAE J*, vol. 33, pp. 42-46.

E 22 Parkhurst, MJ Leverett, SD and Shubrooks, SJ 1972, 'Human tolerance to high sustained +Gz acceleration', *Aerospace Med*, vol. 43, pp. 708-712.

Pecaric, M & Buick, F 1992, 'Determination of a pressure breathing schedule for improving +Gz tolerance', *Aviat Space Environ Med*, July, vol. 63, no. 7, pp. 572-578.

E 26 Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, [Article in FRENCH] 'Symptomatologie Hemorrhoidaire et Pilotes de Chasse,' *Medecine Aeronautique et Spatiale*, tome XXII, pp. 328-332.

E 27 Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, [English ABSTRACT] 'Hemorrhoid symptomatology and fighter pilots,' *Medecine Aeronautique et Spatiale*, vol. 22, p. 1.

E 28 Perraud, RC Marotel, C Le Bellec, G Pissard, R 1983, [English TRANSLATION] 'Hemorrhoid symptomatology and fighter pilots,' *Medecine Aeronautique et Spatiale,* vol. 22, pp. 328-332.

E 15 Pierce, WM et al, 1999, 'Air quality on commercial aircraft', *ASHRAE J*, Sept, pp. 26-34.

Rickards, CA & Newman, DG 2005, 'G-induced visual and cognitive disturbances in a survey of 65 operational fighter pilots', *Aviat Space Environ Med*, May, vol. 76, no. 5, pp. 496-500.

E 16 Select Committee on Science and Technology, Air Travel and Health, London, United Kingdom, Parliament of the United Kingdom, November 2000, report no. 5, accessed on 13 September 2001 via http:///www.parliament.the-station...0/1dselect/1dsctech/121/12102.htm pp. 1-52.

Shaffstall, RM & Burton, RR 1979, 'Evaluation of assisted positive pressure breathing on +Gz tolerance', *Aviat Space Environ Med*, August, vol. 50, no. 8, pp. 820-824.

E 5 Smith, SD 2002, 'Characterizing the effects of airborne vibration on human body vibration response,' *Aviat Space Environ Med*, vol. 73, no.1, pp. 36-45.

E 23 Thibeault, C 1997, 'Cabin air quality', Aerospace Medical Association, *Aviat Space Environ Med*, vol. 68, pp. 80-82.

Travis, TW & Morgan, TR 1994, 'U.S. Air Force positive-pressure breathing anti-G system (PBG): subjective health effects and acceptance by pilots', *Aviat Space Environ Med*, May, vol. 65, no. 5 Suppl., pp. A75-79.

E 32 Welling, DR 2006, 'Military colon and rectal surgery practice', *Clinics in colon and rectal surgery*, vol. 19, no. 3, pp. 134-138.

Whinnery JE 1986, '+Gz-induced loss of consciousness in undergraduate pilot training', *Aviat Space Environ Med*, vol. 57, pp. 997-999.

Whitley, PE 1997, 'Pilot performance of the anti-G straining maneuver: respiratory demands and breathing system effects', *Aviat Space Environ Med*, April, vol. 68, no. 4, pp. 312-316.

E 24 World Health Organisation WHO 2006, ICD-10 Online Search Results for Haemorrhoids, accessed by the SMRC on 9 November 2006 via http://www.who.int/classifications/apps/icd/icd10online/search.aspx, pp. 1-4.

E 3 Zhang, SX Guo, Hz Jing, BS and Liu, SF 1992, 'The characteristics of significance of intrathoracic and abdominal pressure during Qigong (Q-C) maneuvering', *Aviat Space Environ Med*, vol. 63, no. 9, pp. 795-801.

APPENDIX H

ENGLISH TRANSLATION

This is a translation (undertaken by a person who is not accredited with NAATI, and does not have medical-science expertise) from the French *Symptomologie Hemorroidaire et Pilotes de Chasse* as it appears in the Journal *Medecine Aeronautique et Spatiale – tome XXII no. 88 -1983 328-332*, and is subject to the disclaimer in footnote 104 of the attached Reasons for Decision.

THE SYMPTAMOLOGY OF HAEMORRHOIDS AND FIGHTER PILOTS, 1983

PERRAUD R.C, MAROTEL C., LE BELLEC G., PISSARD R.

Abstract
The effect of aeronautical and environmental factors might explain the difference in morbidity, which was not found to be significant in this situation, might exist between fighter pilots and the general population.

The doctor in charge of these persons has an underlying role in the prevention of this condition which might put at risk the security of these planes.

Lieutenant R., during the return flight on a mission to England, mentions the presence of blood on his equipment around his seat. Hereafter noted, he took himself to the medic. The medical exam noted a ruptured exterior haemorrhoid. This sort of stressful incident, could put at risk aircraft safety.

What is the role of aeronautical factors in the epidemiology of this condition? To evaluate the seriousness of the problem and to attempt to appreciate the repercussions of these factors, a scenario is put in play.

A. Theoretical role of aeronautical factors

1.1 Pathophysiology of haemorrhoids

1.1.1 The arteriovenous anastomoses. There are 2 haemorrhoidal venous plexus: interior and exterior. The only pathology of the external plexus is thrombosis. The dilation of the interior haemorrhoidal venous plexus corresponds with proctological “haemorrhoids”. These haemorrhoids could probably become “external haemorrhoids” (4-7). When considering the arterial system, the existence of anastomoses between the haemorrhoidal arteries and the venous haemorrhoidal sacs plays an essential role in the development of haemorrhoids. The anastomoses allow the fattening of the haemorrhoidal venous plexus and by that, the dilation of the sub-mucosal pads of the anal canal partially responsible for anal continence. An exaggerated opening of anteriovenous connections, coupled with a stasis (owed to a gene to return the venous support), all associated with the sliding of the conjunctival vascular pads of the sub-mucosa down the line may be responsible for haemorrhoids (3). We can not then assimilate haemorrhoids to simple haemorrhoidal varicous veins.

1.1.2 With the other factors (6), other than inflammation which is involved as a near constant in the formation of micro-thromboses, anti-inflammatories and microbial

infections underline the favouring role of all that is responsible for the venous state and the vasodilation i.e. amongst other things, constipation and warmth.

What then is it about fighter pilots, that makes them susceptible to create these genetic circumstances of venous drainage and localised inflammation?

1.2 Acceleration

- We limit our acceleration in + Gz. In effect they are the only ones who train with a differing distribution of blood in war, at inertia, blood goes from the head to feet (2). This phenomenon solicits particularly in the venous network a lowering of pressure under the diaphragm. The venous network is distended by the mechanical pressure of the bloodstream proportionate to acceleration. These accelerations, in the previous generations of aeroplanes, commonly surpasses human tolerance. This venous distension is greatest where the external contention of vessels will lessen. It is reversible, so between them, the histophysiological integrity of the arteriovenous system and its immediate environment is conserved. If this integrity is altered, the cessation of acceleration is no more of a consequence than a full recovery in diameter and vascular function = the bed of first pathological presentation is set.

1.2.2 The equipment **–** Certain methods of war against aeronautical attack could theoretically favour these manifestations; it is then a problem of aeronautical ergonomics. The first equipment came close to an anti G suit. Recall that this clothing was an inflexible structure in which were five rubber bladders (one on each calf, one on each thigh, one on the abdomen). These bladders, fed by gas under pressure, regulated by the accelerometer, self-inflating and automatically deflating in relation to acceleration. Studied to counter, so the acceleration + Gz, the venous distension under the diaphragm and thus the accumulation of blood in this area, is in the main responsible for a deficit in cerebral blood volume, it allows the pilot to ward off the appearance of trouble at 1.5G.

The increase in the mass of blood, due to acceleration + Gz is then limited to the blood vessels located in the muscles of the lower limbs. The blood then returns to the heart hampered by the abdominal pressure created by the corresponding bladders. The only area without veritable contention, natural or artificial is the perineal region; the distension there is predominant. In anti G warfare, M1 or L1 manoeuvres, under abdominal pressure that they look to create, increases the risk of momentary pelvic congestion.

Another type of protection used in flight, often favoured for the appearance or aggravation of haemorrhoid symptoms, is breathing under pressure. Under about 12000 metres, if you can maintain alveolar oxygen pressure partially at 69 hPa (brink of appearance of hypoxic symptoms), which is essential to maintain intra-pulmonary pressure at 185 hPa. This depends on the amount of pressure which is raised equally in response to a decrease in barometric pressure (1).

The amount of compression is limited to around 40 hPa because the signs of intolerance increase in the head, the respiratory and as the circulatory systems. In effect, this intra-pulmonary compression, not only expels a large amount of thoracic blood but might also hamper to the point of stopping the venous return from the legs and abdomen. It assists with the increasing the peripheral venous pressure with the distension of the pelvic and lower limb venous network, associated with the extravasation of plasma.

For high performance aircraft, Mirage 2000, investigate a pressurised respiration system coupled with anti-G pants, completed by an inflatable vest to maintain thoracic pressure. It risks an increase of problems associated with pulmonary compression and anti-G pants. However, the briefness of exposure and above all the other dangers which are otherwise more important in these situations relegates these risks to second place.

1.3 Factors related to the mission

1.3.1 The type of mission **–** the classic experience granted to fighter pilots skills in 2 types of missions:
- Combat missions which in a Mirage 2000 or F16 might give a pilot sudden line of acceleration + Gz between 3 to 8 Gz for about fifty seconds, in an iterative fashion (5).
- Missions at low or very low altitude, of medium or long duration, during which the constraints of the atmosphere plays a dominant role.

1.3.2 Atmospheric constraints **–** The seated position during a long mission, with eventual mid-air refuelling for a pilot with isolating undergarments, waterproof garments and anti-G garments, in elevated temperatures may lead to inguinal compression that hampers the venous return, macerated venous dilation, pruritis ani as a result of this heat.

The sudation along with the inhalation of dry O2 could lead to notable dehydration, to the point of constipation.

1.4 Factors related to personal hygiene

1.4.1 Food is often implicated. So to exercises, flights often with irregular hours and food favouring a restricted diet (sandwiches, cold meats). On return to better conditions, there is a tendency to an overconsumption of protein and spices by way of meals of kebabs, barbecues and grills.

The life of a pilot is punctuated with professional, family or personal events, peppered with alcoholic drink.

All of that accumulates to create critical periods for susceptible individuals.

1.4.2 A sedentary lifestyle is the menace of everyone. This, other than the fact that is favours constipation, is often accompanied by an increase in weight and loss of muscle tone.

II. MORBIDITY INVESTIGATION

2.1 Studied population

- 70 questionnaires (Table 1) were distributed to fighter pilots from different units. To obtain honest replies, strict anonymity was followed whilst conducting the questionnaire, this anonymity provided a large number of responses, 52 in total.

- The reference group was defined as follows: the 70 pilots were divided in age groups at 5 year intervals (20 to 25 years, 25 to 30 years, etc. to age 45), 70 controls divided identically by age were selected on the basis of the medical profile (SIGYCOP) of a 1 in

2 possibility of responses would be received (P. 60). We note that the random distribution of responses by age is comparable between the two populations.

2.2 Results

- Of the 52 pilot responses, 18 advised that they had haemorrhoid symptoms.
- Of the 60 responses from the control group, 12 advised that they had haemorrhoid symptoms.
- The usable results are collated in Table 1.

2.3 Analysis and comments

2.3.1 Analysis

The frequency of patients reporting haemorrhoid symptoms in the control population (12/60) is comparable to that of the theoretical population = P = 12/60 = 0.200. The frequency of pilots reporting haemorrhoid symptoms is 18/52 = P() = 0.346. using the technique when observing 2 percentages we calculate E = 1.79, which is then inferior to threshold of significance of 5 percent (1.96). There is therefore no significant difference between the two populations.

2.3.2 Comments

- The number of positive responses is not equal or lesser to reality, given the difficulty in admitting the condition.
- The study requires a control population selected on the same physical characteristics as the flight personnel, but it is actually impossible.
- the difference in morbidity is not significant in the studied sample. A study of a larger number of individuals might otherwise allow for differing results or at least a refinement.
- There are two traits to note in the responses:
a) only 7 had consulted an Army doctor
b) 5 had made a direct relationship between an episode and aeronautical factors.

TABLE 1. QUESTIONNAIRE

a) Flight Personnel responses

			APPEARANCE		
	YES	NO	Without any flights	Between 500 & 1000 Hours	Greater than 1000 Hours
Have you ever suffered with haemorrhoids	16	34	1	1	4
Approximate number of occurrences per year					
<3	6				
>3	4				
Did you consult a:					
- Civilian Doctor	7				
- Army Doctor	7				
Have you noticed a direct relationship between occurrences and missions	5				
If YES please describe the mission:	Intensive flying with combat				

b) Control Group responses

			APPEARANCE			
	YES	NO	Outside a period of engagement	Between 20 & 25 years old	Between 25 & 35 years old	Older than 35 years
Have you ever suffered with haemorrhoids	12	48		2	3	1
Approximate number of occurrences per year						
<3	9					
>3	3					

III ROLE OF FLIGHT PERSONNEL DOCTORS

Ministerial Instruction #3700 although that it does not explicitly mention haemorrhoids states: “disorders marked by peripheral venous circulation which leads to incapacity”. This explains the concealment of pilot’s concerns at the time of assessment. This also adds to the side, still taboo that this topic is often not discussed other than by a quick question from an expert who does not know a faster response from a pilot, responses that in these conditions do little more than reassure all concerned.

When we know the fears of the pilot of what is written on their medical file, a diagnosis which may be compromising, the knowledge of the flight doctor does not instil a climate of confidence. This climate does not occur when the doctor proves that their intellectual rigour is tempered by a more realistic understanding of the apprehension with the situation. It is imperative that one does not put at risk the safety of aircraft, like what may have occurred in the case of Lieutenant R.

It is up to the flight personnel doctors to assure that the health education of pilots regarding food and drink hygiene and to ensure an order to undertake a minimum level of physical activity.

Amongst specialists, the possibility of a periodic anoscopic examination at Flight Personnel Medical Centres could be considered.

CONCLUSION

The pathology of haemorrhoids, as a result of many factors, arterial, venous and environmental is, in our study of greater importance to flight personnel than the control although the incidence is not significantly different. Better education of flight personnel in the role aeronautical factors effect on personal health should be reinforced by the Chief Medical Officer (Flight Personnel). It will be equally important to ensure the detection of this pathology so that a sudden complication does not put at risk aircraft safety.

BIBLIOGRAPHY

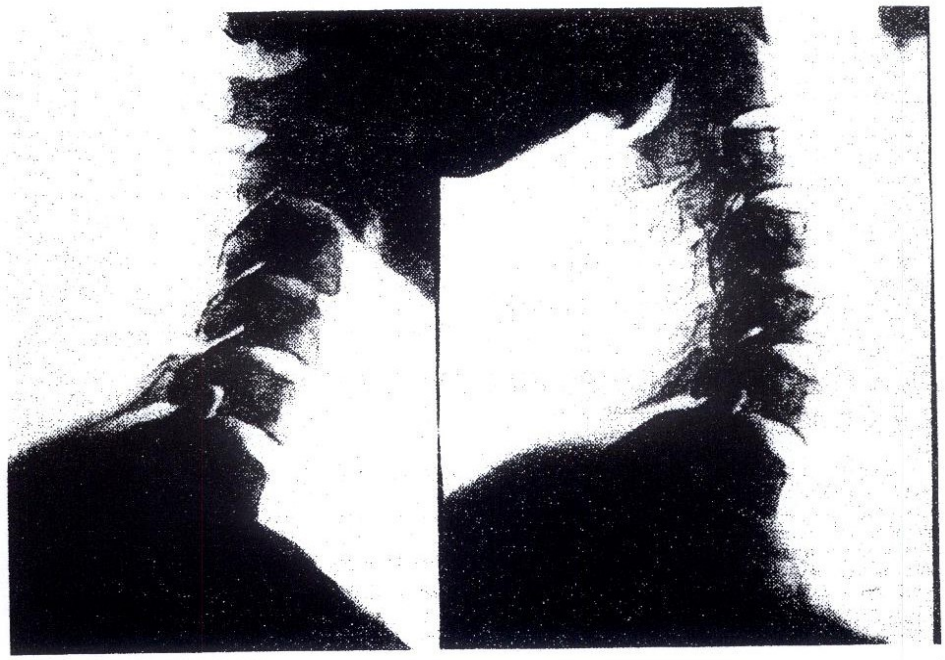
1. COLIN J. Hypoxia – EASSAA – 1977 – T20 = 28-30.
2. COLIN J. Acceleration – EASSAA – 1978 - T1 = 29-31.
3. DAVY A., DUVAL C. Macroscopic and microscopic pathological anatomy of the haemorrhoidal vascular network in haemorrhoid conditions. Phlebologie – 1980 – 33=669-681.
4. DUHAMEL J., ROMAND Y. Haemorrhoids, Encycl. Med. Chir. Paris – Stomach – Intestines. 9086 – A10 – 3 – 1979.
5. GOUARS M., HERNANDEZ, MARTINEZ JP. Pilot tolerance of acceleration. Aircraft safety bulletin. No. 149 – 1982/4=10-11.
6. RIVA R., ROSSI N. *“Moderni aspetti in terna di patologia emorroïdaria. Rivista di médicina aéronautica”* 1979 XLII =3/4.
7. SARLES JC. Pathophysiology of the venous circulation of the anal canal. The diagnostic pitfalls of haemorrhoids – Phlebologie 1980 – 33=607-612.

ABSTRACT in English sourced by the Commission

Hemorrhoid symptomatology and fighter pilots
PERRAUD, R C; MAROTEL, C; LE BELLEC, G; PISSARD, R
***Medecine Aeronautique et Spatiale*, vol. 22, pp. 328-332. 3rd Quarter, 1983**

The relationship between the fighter-aircraft environment and mission and the development of hemorrhoids (H) is analyzed, and the results of a survey of pilots are presented. The physiopathology of H is reviewed; the circulatory effects of +Gz acceleration, breathing under pressurization, and anti-G suits are considered; and the typical Mirage-2000 or F-16 mission and pilots' lifestyle are examined. A group of 70 pilots and a control group of 70 males of similar age distribution were surveyed by questionnaire, and an increased incidence of H in the pilot group is found to be nonsignificant at a 5-percent level. The role of the physician in diagnosing and treating pilot H is made more difficult both by the pilots' general unwillingness to discuss the symptoms and by their fear of being disqualified (as suggested by the French military health rules). It is recommended that physicians use a degree of discretion in reporting mild H cases officially, while urging the affected pilots to make appropriate changes in diet and exercise.

Descriptors: Military aircraft; Military planes; Circulation; Pressurizing; Aerospace medicine; Aircraft pilots; Diseases; Pathology; Symptomology; Acceleration stresses (physiology); Fighter aircraft; Physicians



Incident aérien 29 mai 1979 - Dijon

SYMPTOMATOLOGIE HEMORROIDAIRE ET PILOTES DE CHASSE

PERRAUD R.C.*, MAROTEL C., LE BELLEC G.***, PISSARD R.*****

**Médecin-Principal, assistant de médecine aéronautique, médecin-chef du service médical 50/102 de DIJON.*
***Médecin adjoint S.M. 50/102 de DIJON - Ancien interne du C.H.U. de LYON.*
**** Médecin adjoint S.M. 50/102 de DIJON.*

RESUME

L'effet des facteurs aéronautiques et environnementaux peut expliquer la différence de morbidité, qui, bien qu'elle ne soit pas significative dans l'enquête réalisée ici, semble exister entre les pilotes de chasse et la population témoin.

Le médecin chargé de ce personnel voit ici souligner son rôle dans la prévention de cette affection qui peut mettre en jeu la sécurité des vols.

Le Lieutenant R., pendant le vol de retour d'une mission en ANGLETERRE, constate la présence de sang sur son équipement au niveau du siège. Sitôt posé, il se porte consultant. L'examen médical objective une rupture d'un paquet hémorroïdaire extériorisé. Ce genre d'incident, vu son caractère anxiogène, aurait pu mettre en jeu la sécurité des vols.

Quel peut-être le rôle des facteurs aéronautiques dans la genèse d'une telle pathologie? Pour évaluer l'importance du problème et pour tenter d'apprécier le retentissement de ces facteurs, une enquête a été réalisée.

A. ROLE THEORIQUE DES FACTEURS AERONAUTIQUES

1.1. Rappel physiopathologique des hémorroïdes

1.1.1. Les anastomoses artérioveineuses. Il existe 2 plexus veineux hémorroïdaires: l'interne et l'externe. La seule pathologie du plexus externe est la thrombose. La dilatation du plexus veineux hémorroïdaire interne correspond aux «hémorroïdes» des proctologues. Ces hémorroïdes peuvent se prolaber devenant alors des «hémorroïdes externes» (4-7). On considère actuellement que le système artériel, par les anastomoses existant entre les artères hémorroïdales et les saccules des veines hémorroïdaires, joue un rôle primordial dans le développement des hémorroïdes. Les anastomoses permettent la réplétion des plexus veineux hémorroïdaires et, par là, la dilatation des coussinets sous muqueux du canal anal responsable en partie de la continence anale. Une ouverture exagérée des communications artérioveineuses, couplée à une stase dûe à une gène au retour veineux en aval, le tout associé au glissement des coussinets conjonctivovasculaires de la sous-muqueuse en aval seraient responsables des hémorroïdes (3). On ne peut donc pas assimiler les hémorroïdes à de simples varices des veines hémorroïdaires.

1.1.2. Parmi les autres facteurs (6), outre l'inflammation qui y participe de façon quasi constante sous forme de microthromboses et d'infiltrats inflammatoires et l'infection sous forme de microabcès, soulignons le rôle favorisant de tout ce qui majore la stase veineuse et la vasodilatation à savoir, entre outre, la constipation et la chaleur.

Quels sont alors chez le pilote de chasse les contraintes susceptibles de créer ces circonstances de gène au retour veineux et d'aggression locale?

1.2 Les accélérations

– Nous nous limiterons aux accélérations + Gz. En effet ce sont les seules qui entrainent une nouvelle répartition du volume sanguin avec chasse, par inertie, du sang de la tête vers les pieds (2). Ce phénomène sollicite particulièrement le réseau vasculaire à basse pression sous diaphragmatique. Le réseau veineux est distendu par la pression mécanique de la colonne sanguine proportionnellement à la valeur de l'accélération. Ces accélérations, sur les avions de la dernière génération, dépassent couramment la tolérance humaine. Cette distension veineuse sera maximale là où la contention externe du vaisseau sera moindre. Elle est réversible lorsque, entre autre, l'intégrité histophysiologique du système artérioveineux et de son environnement immédiat est conservée. Si cette intégrité est altérée, l'arrêt de l'accélération n'aura plus pour conséquence une restitution ad integrum du diamètre et du fonctionnement vasculaire = le lit des premières manifestations pathologiques est prêt.

1.2.2. Les équipements - Certains moyens de lutte contre les aggressions aéronautiques peuvent théoriquement favoriser ces manifestations; c'est alors un problème d'ergonomie aéronautique. Le premier équipement qui vient à l'esprit est la combinaison anti G. Rappelons que ce vêtement est constitué d'une structure inextensible dans laquelle sont insérées cinq vessies de caoutchouc (une sur chaque mollet, une sur chaque cuisse, une sur l'abdomen). Ces vessies, alimentées en gaz sous pression régulé par un accéléromètre, se gonflent et se vident automatiquement en fonction de l'accélération. Etudié pour contrer, lors d'accélération + Gz, la distension veineuse sous diaphragmatique et donc l'accumulation sanguine dans ce secteur, responsable en grande partie du déficit sanguin cérébral, il permet au pilote de repousser d'1,5 G l'apparition des troubles.

L'accroissement de la masse sanguine, dû à l'accélération + Gz est donc limité au niveau des masses musculaires des membres inférieurs par les vessies situées en regard. Le sang voit son retour au cœur droit gêné par la pression abdominale créée par la vessie correspondante. Le seul territoire sans contention véritable, naturelle ou artificielle reste la région périnéale; la distension peut y être alors prédominante. Dans la lutte anti G, les manœuvres type M1 ou L1, par la surpression abdominale qu'elles cherchent à créer, majorent le risque de congestion pelvienne momentanée.

Un autre moyen de protection utilisé en aéronautique, susceptible de favoriser l'apparition ou l'aggravation d'une symptomatologie hémorroïdaire, est la respiration en surpression. Au dessus de 12 000 m environ, si on veut assurer une pression partielle d'oxygène alvéolaire de 69 hPa (seuil d'apparition des troubles hypoxiques) il faut maintenir la pression intra pulmonaire à 185 hPa. De ce fait va dépendre la valeur de la surpression qui devra augmenter d'une valeur égale à la décroissance de la pression barométrique (1).

Cette possibilité de surpression est limitée à environ 40 hPa car les manifestations d'intolérance sont nombreuses tant au niveau de la tête et de l'appareil respiratoire que de l'appareil circulatoire. En effet, cette surpression intra pulmonaire, non seulement chasse une grande partie du sang thoracique mais peut gêner jusqu'à stopper le retour veineux en provenance des membres et de l'abdomen. On assiste alors à une augmentation de la pression veineuse périphérique avec distension du réseau veineux du pelvis et des membres inférieurs, associée à une extravasation plasmatique.

Pour les avions à haute performance, type Mirage 2000, est à l'étude un système de respiration en surpression couplé au pantalon anti G complété d'un gilet gonflable pour assurer la contre pression thoracique. On risque alors d'observer une accentuation des troubles dûe à l'association surpression pulmonaire et pantalon anti G. Mais la brièveté de l'exposition et surtout les autres dangers autrement plus importants dans cette situation relèguent au second plan ce risque.

1.3. Facteurs liés à la mission

1.3.1. Le type de mission - L'expertise classique donne au pilote de chasse une aptitude à 2 types de missions:

– La mission de combat qui sur Mirage 2000 ou F.16 peut amener le pilote à subir des profils d'accélération + Gz oscillants entre 3 et 8 Gz pendant une cinquantaine de secondes, de façon itérative (5).
– La mission en basse ou très basse altitude, de moyenne ou longue durée, pendant laquelle les contraintes d'ambiance jouent un rôle prépondérant.

1.3.2. Les contraintes d'ambiance - La position assise pendant une mission de longue durée, avec éventuellement

ravitaillement en vol pour un pilote équipé du sous vêtement isolant, de la combinaison étanche et de la combinaison anti G, par température élevée peut entraîner une compression inguinale gênant le retour veineux et une vasodilatation veineuse avec macération, prurit anal dûes à la chaleur.

La sudation ajoutée à l'inhalation de O2 sec peut conduire à une déshydratation notable, point de départ d'une constipation.

1.4. Facteurs liés à l'hygiène de vie

1.4.1. L'alimentation peut souvent être mise en cause. Lors des pétiodes d'exercices, une activité aérienne dense entraîne souvent un dérèglement des horaires et des menus privilégiant les régimes sans résidus (sandwich, charcuterie). Dès le retour des beaux jours, réapparaît la surconsommation protidique accompagnée d'épices à l'occasion de repas type brochettes, méchoui ou grillades.

La vie du pilote est jalonnée d'événements professionnels, familiaux, ou personnels, émaillés «d'arrosages» avec des boissons plus ou moins alcoolisées.

Tout cela, cumulé, peut créer des épisodes critiques pour les sujets prédisposés.

1.4.2. La sédentarité est un danger qui menace tout le monde. Celle-ci, outre le fait qu'elle favorise la constipation, est souvent concommittante à une prise de poids et à un relâchement musculaire.

II. ENQUETE DE MORBIDITE

2.1. Populations étudiées

– 70 questionnaires (tableau I) ont été distribués à des pilotes de chasse de différentes unités. Pour obtenir des réponses honnêtes, un strict anonymat a été recherché dans l'élaboration de ce questionnaire, anonymat qui nous prive de beaucoup de renseignements; 52 réponses ont été reçues.
– La population de référence a été définie ainsi: les 70 pilotes visés ayant été répartis par tranche d'âge de 5 ans (20 à 25, 25 à 30 et ainsi jusqu'à 45 inclus), 70 témoins, répartis en nombre identique dans ces tranches d'âge, ont été sélectionnés sur un profil médical (SIGYCOP) de 1 partout avec 2 éventuellement au P. 60 réponses ont été reçues. Nous avons admis que la distribution aléatoire des réponses par tranche d'âge est comparable entre les deux populations.

2.2. Résultats

– Sur les 52 réponses des pilotes, 18 signalent l'existence d'une symptomatologie hémorroïdaire.

– Sur les 60 réponses du lot témoin, 12 signalent l'existence d'une symptomatologie hémorroïdaire.
– Les réponses exploitables ont été collationnées sur le tableau I.

2.3. Analyse et commentaires

2.3.1. Analyse

La fréquence des patients porteurs d'hémorroïdes symptomatiques dans le lot témoin (12/60) a été assimilée à celle de la population théorique = P = 12/60 = 0,200. La fréquence des pilotes porteurs d'hémorroïdes symptomatiques est de 18/52 = P0 = 0,346. Avec la technique dite des 2 pourcentages observés on calcule E = 1,79 qui est donc inférieur au seuil de signification à 5 pour cent (1,96). Il n'y a donc pas de différence significative entre les deux populations.

2.3.2. Commentaires

– Le nombre de réponses positives obtenues ne peut qu'être égal ou inférieur à la réalité, vu la difficulté d'un tel aveu.
– Il aurait fallu disposer d'une population témoin sélectionnée sur les mêmes critères physiques que le personnel navigant (P.N.), c'est actuellement impossible.

– La différence de morbidité n'est pas significative sur les échantillons analysés. Une étude sur un plus grand nombre permettrait sinon de modifier les résultats tout au moins de les affiner.
– Parmi les réponses, 2 traits sont à noter:
a) 7 seulement ont reconnu avoir consulté un médecin des Armées
b) 5 ont fait une relation directe entre une crise et les facteurs aéronautiques.

III. ROLE DU MEDECIN DU P.N.

L'Instruction Ministérielle n°3700 bien qu'elle ne fasse pas explicitement mention des hémorroïdes est ainsi libellée: «les troubles marqués de la circulation veineuse périphérique entrainent l'inaptitude». Ceci suffirait à expliquer la dissimulation par les pilotes de leurs ennuis, lors des expertises. A ceci s'ajoute le côté encore tabou de ce sujet qui trop souvent n'est réglé que par une rapide question de l'expert qui n'appelle qu'une réponse encore plus rapide du pilote, réponse qui dans ces conditions ne peut être que rassurante pour tout le monde.

Quand on connaît la crainte du pilote de voir inscrit sur son dossier médical un diagnostic qu'il estime compromettant, la connaissance par le médecin du P.N. ne peut être que la résultante d'un climat de confiance. Ce climat n'est obtenu que lorsque le médecin a prouvé que sa rigueur intellectuelle était tempérée par une réaliste largeur d'esprit dans l'appréhension de la situation. C'est indispensable pour que ne soit pas mise en jeu la sécurité des vols comme cela aurait pu arriver dans le cas du Lieutenant R.

Il appartient au médecin du P.N. d'assurer l'éducation sani-

a) destiné au P.N. avec les réponses obtenues
(voir tableau)

	APPARITION					
	OUI	NON	antérieur tout vol	entre 500 et 1000 H	entre 1000 H et plus	
Avez vous déja souffert des hémorroïdes	18	34	1	1	4	
Fréquence approximative des crises par an < 3	6					
> 3	4					
Avez vous déja consulté : - Médecin civil	7					
- Médecin des Armées	7					
Avez vous fait une relation directe entre une crise et une mission	5					
Si OUI caractéristique de la mission :	vols intensifs avec combat.					

b) destiné au groupe comparatif avec les réponses
obtenues

	APPARITION					
	OUI	NON	antérieur à l'engagement	entre 20 et 25 ans	entre 25 et 35 ans	35 et plus
Avez vous déja souffert des hémorroïdes	12	48		2	3	1
Fréquence approximative des crises par an. < 3	9					
> 3	3					

TABLEAU I

351

taire des pilotes sur l'hygiène alimentaire solide et liquide et de faire mettre en œuvre par le commandement un programme d'activité physique minimum.

Dans le cadre de l'expertise, la question d'une anuscopie périodique au niveau des centres d'expertises médicales du P.N. peut-être posée.

CONCLUSION

La pathologie hémorroïdaire, résultante de plusieurs facteurs, artériels, veineux et environnementaux est, dans notre étude plus importante dans le P.N. que dans le lot témoin bien que non significativement différente. Une meilleure information du P.N. tant sur le rôle des facteurs aéronautiques que sur l'hygiène de vie doit être assurée par le médecin chargé du P.N. Il devra également s'attacher à dépister cette pathologie afin qu'une complication brutale ne vienne pas mettre en jeu la sécurité des vols.

BIBLIOGRAPHIE

1. COLIN J. Hypoxie - EASSAA - 1977 - T2 = 28 - 30.
2. COLIN J. Les accélérations - EASSAA - 1978 - T1 = 29 - 31.
3. DAVY A., DUVAL C. Anatomie pathologique macroscopique et microscopique du réseau vasculaire hémorroïdal dans la maladie hémorroïdaire. Phlébologie - 1980 - 33 = 669 - 681.
4. DUHAMEL J., ROMAND Y. Hémorroïdes. Encycl. Med. Chir. Paris - Estomac - Intestins. 9086 - A10 - 3 - 1979.
5. GOUARS M., HERNANDEZ, MARTINEZ JP. Tolérance des pilotes aux accélérations. Bulletins de sécurité des vols. N°149 - 1982/4 = 10 - 11.
6. RIVA R., ROSSI N. Moderni aspetti in terna di patologia emorroïdaria. Rivista di médicina aéronautica 1979 XLII = 3/4.
7. SARLES JC. Physiopathologie de la circulation veineuse du canal anal. Les pièges du diagnostic des hémorroïdes. - Phlébologie 1980 - 33 = 607 - 612.

LE LABORATOIRE DE MEDECINE AEROSPATIALE DU CENTRE D'ESSAIS EN VOL

M.C.H.VIEILLEFOND
Professeur Agrégé,
Médecin Chef du C.E.V. et du LAMAS

A l'aube des années 50, l'industrie aéronautique française annihilée par la guerre reprend ses activités. A un rythme que l'on ne connaîtra plus, les prototypes sortent des bureaux d'études et volent: Ouragan, Mystère, Gerfaut, Trident, Griffon.

Or, si de 1930 à 1950 l'essentiel des connaissances concernant les grands thèmes de la médecine aéronautique (hypoxie, dysbarisme, accélérations) étaient acquises, on s'aperçut qu'au fur et à mesure que les performances des avions augmentaient, les limites de la tolérance physiologiques étaient atteintes voire dépassées. C'est à cette époque aussi qu'apparaît la nécessité de confier à des équipes pluridisciplinaires l'étude de l'interface homme-machine tant sur le plan opérationnel que de la sécurité aérienne. Cet état de fait conduisit à la décision de construire un laboratoire permettant aux médecins et aux ingénieurs de collaborer à l'étude des facteurs nocifs du vol et à leur prévention. L'implantation de ce laboratoire au sein du Centre d'Essais en Vol (C.E.V.) devait permettre l'intégration des études physiologiques à la conception et à la mise au point des matériels aéronautiques.

Grâce aux crédits mis en place par la Direction Technique Industrielle de l'Aéronautique et par l'Etat Major de l'Armée de l'Air, la première pierre fut posée en septembre 1954 et le Laboratoire d'Etudes Médicophysiologiques inauguré officiellement trois ans plus tard.

Ce laboratoire constitue, actuellement sous le nom de Laboratoire de Médecine Aérospatiale, une section d'essais du Centre d'Essais en Vol au même titre que la section d'Essais Armes et Engins ou essais avions, c'est dire sa totale intégration à l'établissement.

Les expérimentations réalisées sont conçues et dirigées par des chercheurs, médecins, pharmaciens et vétérinaires, affectés par la Direction Centrale du Service de Santé des Armées dans le cadre de la participation de ce service aux activités de la Délégation Générale pour l'Armement dont dépend le C.E.V.

Le laboratoire a pour mission essentielle l'étude des agressions rencontrées en aéronautique, d'en établir les mécanismes physiopathologiques, de fixer les limites de la tolérance humaine et de contribuer à la mise au point de moyens de protection destinés à assurer le confort, la sécurité et la survie des équipages et passagers d'avions. De ce fait les principales activités concernent d'une part des essais d'équipement ou des études d'ergonomie et d'autre part des recherches de physiologie humaine. Dans le premier cas le laboratoire joue un rôle d'expert dans la certification d'équipements de protection individuels ou collectifs, ou de conseiller pour la mise au point ou l'amélioration des matériels. Il entreprend aussi des études à plus long terme concernant l'ergonomie des postes de pilotage ou la conception de moyens de protection nouveaux. Dans le second