



## Australasian College of Sports and Exercise Physicians Position Statement

### The use of Autologous Mesenchymal Stem Cells in Sport and Exercise Medicine

#### Introduction

- This Australasian College of Sport and Exercise Physicians (ACSEP) Position Statement provides a 2017 update to the previously published ACSEP Position Statements.(1, 2)
- Where applicable, level 1-2 evidence<sup>1</sup> has been utilised to formulate the current position statement.

#### Background

- The use of autologous mesenchymal stem cells with their identified capability of differentiating into various mesodermal and endodermal cell lines, has the theoretical potential and shows promise of being able to positively influence musculoskeletal tissue healing and regeneration.(3)
- The use of stem cells as a means of treatment are being investigated across a range of medical disciplines,(4) but stem cell research in the realm of musculoskeletal sports medicine is of varying quality.(5-7)
- The means of extraction, manipulation and application of mesenchymal stem cell therapy in musculoskeletal medicine remains an evolving, non-standardised practice.(8)
- The application of autologous mesenchymal stem cells (MSC) in the management of sports injuries and degenerative musculoskeletal conditions is an emerging approach to treatment that is being embraced by industry, patients and many practitioners.(3, 4, 9)
- Sports and Exercise Medicine, particularly as practiced with elite athletes, has a history of working at the “cutting edge” of musculoskeletal practice enabling the early adoption of new technology and techniques.(10-12)
- To date, the majority of research investigating the use of MSC for musculoskeletal conditions has contributed only low level evidence.(6, 7)
- The development and clinical application of mesenchymal stem cell therapies in Sports Medicine has a significant industry and commercial influence.(5, 13)
- The combination of commercial interest, limitations in regulatory oversight, complex pathology and high levels of consumer expectation, has created an environment where the unproven potential of MSC therapy is an enticement for both practitioners and patients.
- Regulation of stem cell therapy remains a complex, evolving area, with multiple invested parties.(14) The Therapeutic Goods Administration (Australia’s regulatory authority for therapeutic goods) has recently completed a two year public consultation process and has committed to enhanced regulation of the use of Stem Cell therapies.<sup>2</sup> Future regulatory clarity on the use of Stem Cells may result in the evolution of components of this position statement.

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<sup>1</sup> For details on levels of evidence, readers are directed to references 23-25

<sup>2</sup> For further details see: <https://www.tga.gov.au/media-release/regulation-autologous-cell-and-tissue-products>



- The ACSEP Code of Ethics provides further details on the standards of practice for Sports Physicians with regard to industry influence, research standards and the application of evidence-based medicine in sports medicine.<sup>3</sup>

#### **ACSEP Position on the Efficacy of Autologous Mesenchymal Stem Cell Therapy in Sport and Exercise Medicine<sup>4</sup>**

##### **Osteoarthritis**

- The most recent systematic review of Stem Cell therapy in knee osteoarthritis found only 5 randomised trials including 101 patients, assessing the role of MSC in osteoarthritis.(7)
- All included studies had a high risk of bias.(7)
- Level 4 – 5 evidence was found for reduction in pain, patient reported outcomes, imaging outcomes, histological and arthroscopic outcomes.(7)

##### **Tendinopathy**

- The most recent systematic review of Stem Cell therapy in tendinopathy revealed only 4 published trials, totalling 79 patients.(6)
- All studies had a high risk of bias.(6)
- Level four evidence supports positive outcomes from stem cell therapy.(6)

##### **Osteochondral Defects**

- While methodologies have been published,(15) no randomised controlled trials or systematic reviews of the use of MSC to manage osteochondral defects were identified.

##### **Other**

- No additional randomised controlled trials or systematic reviews for the management of musculoskeletal conditions were identified.

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<sup>3</sup> Readers are directed to the following link for details.

<http://www.acsep.org.au/content/Document/P015%20Code%20of%20Ethics%20%26%20Professional%20Behaviour.pdf>

<sup>4</sup> This position statement addresses only those conditions frequently managed by Sport and Exercise Physicians. Specifically, it has not considered research related to combined surgical procedures.



### **ACSEP Position on the Safety of Autologous Mesenchymal Stem Cell Therapy in Sport and Exercise Medicine**

- Formal assessment of safety must consider the wide variation in source, preparation and application of stem cells in therapeutic approach.
- Evidence for the safety of stem cell therapies remains inadequate with limited long term follow-up data.
- Both mild and severe adverse outcomes from the therapeutic use of stem cells have been reported in the non-musculoskeletal application of MSC.(16-21)
- The majority of reports indicate that at least in short term follow-up, the use of MSC in musculoskeletal sports medicine practice is relatively safe. There are currently no long term follow-up studies.(6, 7, 22)

### **ACSEP Position on the use of Mesenchymal Stem Cell therapies in Sport and Exercise Medicine**

1. There is insufficient evidence to support the use of MSC therapy in the routine management of musculoskeletal injuries or degenerative conditions typically managed by Sport and Exercise Physicians.
2. The inclusion of innovative MSC therapies into routine clinical practice should only occur after clinical trials establish reproducible evidence of MSC efficacy and safety in musculoskeletal sports medicine.
3. The ACSEP endorses only stem cell research that contributes L1-3 evidence.(23-25)
4. The ACSEP recognises the importance of proactive regulatory oversight for the processing and manipulation of any medical product, including MSC.
5. While both safety and efficacy data are lacking, the ACSEP believes it is unethical and unprofessional to market stem cell interventions directly to patients.
6. This position statement does not preclude the ACSEP from future recognition of the role MSC may play in the management of musculoskeletal sport medicine should acceptable levels of efficacy and safety be established.



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Reviewed and Endorsed by ACSEP Research Committee

Approved by ACSEP Board November 14, 2017

For review 2020, or under direction of ACSEP Board

### **Working Group**

**Dr. Bruce Hamilton (Chair)** – FACSEP

**Dr. Greg Lovell** – FACSEP

**Dr. Lynley Anderson** – PhD

**Dr. Jeni Saunders** – FACSEP, has previously performed small number (4) bone marrow aspirate concentrated MSC procedures and ceased these when the initial Position Statement on Stem Cells was released.

**Dr. Ruben Branson** – FACSEP, Director at SportsMed Biologic, has previously provided mesenchymal / stromal vascular fraction (SVF) / stem cell therapy to patients with osteoarthritis in very small numbers with no income received from any stem cell company or related financial institution or entity, nor any shares or financial relationship with any stem cell provider.



## References

1. Osborne H, Anderson L, Burt P, Young M, Gerrard D. Australasian College of Sports Physicians- Position Statement: The Place of Mesenchymal Stem/Stromal Cell Therapies in Sport and Exercise Medicine. *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*. 2016 Mar;26(2):87-95.
2. Osborne H, Castricum A. Change to Australasian College of Sport and Exercise Physicians- position statement: the place of mesenchymal stem/stromal cell therapies in sport and exercise medicine. *British journal of sports medicine*. 2016 Oct;50(20):1229.
3. Ajibade DA, Vance DD, Hare JM, Kaplan LD, Lesniak BP. Emerging Applications of Stem Cell and Regenerative Medicine to Sports Injuries. *Orthopaedic journal of sports medicine*. 2014 Feb;2(2).
4. Handbook TASC. What you should know about stem cell therapies: now and in the future. Australia2015.
5. Sipp D, Caulfield T, Kaye J, Barfoot J, Blackburn C, Chan S, et al. Marketing of unproven stem cell-based interventions: A call to action. *Science translational medicine*. 2017 Jul 05;9(397).
6. Pas HI, Moen MH, Haisma HJ, Winters M. No evidence for the use of stem cell therapy for tendon disorders: a systematic review. *British journal of sports medicine*. 2017 Jan 11.
7. Pas HI, Winters M, Haisma HJ, Koenis MJ, Tol JL, Moen MH. Stem cell injections in knee osteoarthritis: a systematic review of the literature. *British journal of sports medicine*. 2017 Mar 03.
8. Goldberg A, Mitchell K, Soans J, Kim L, Zaidi R. The use of mesenchymal stem cells for cartilage repair and regeneration: a systematic review. *Journal of orthopaedic surgery and research*. 2017 Mar 09;12(1):39.
9. Barry F, Krawetz R, Adesida A. Mesenchymal Stem Cells: The hope, the hype and the reality in the treatment of osteoarthritis. In: Paper BaJHSCNW, editor. Alberta, Canada2017.
10. Lee P, Kwan A, Nokes L. Actovegin--Cutting-edge sports medicine or "voodoo" remedy? *Current sports medicine reports*. 2011 Jul;10(4):186-90.
11. Li Y, Fu FH, Huard J. Cutting-edge muscle recovery: using antifibrosis agents to improve healing. *The Physician and sportsmedicine*. 2005 May;33(5):44-50.
12. Reilly T. Research in sport and exercise science: the cutting edge. *Journal of sports sciences*. 2001 Mar;19(3):161-2. PubMed PMID: 11256820. Epub 2001/03/21. eng.
13. Sipp D. Stem cell stratagems in alternative medicine. *Regenerative medicine*. 2011 May;6(3):407-14.
14. Marks PW, Witten CM, Califf RM. Clarifying Stem-Cell Therapy's Benefits and Risks. *The New England journal of medicine*. 2017 Mar 16;376(11):1007-9.
15. Freitag J, Ford J, Bates D, Boyd R, Hahne A, Wang Y, et al. Adipose derived mesenchymal stem cell therapy in the treatment of isolated knee chondral lesions: design of a randomised controlled pilot study comparing arthroscopic microfracture versus arthroscopic microfracture combined with postoperative mesenchymal stem cell injections. *BMJ open*. 2015 Dec 18;5(12)



16. Dillon HDSC. Inquest into the death of Sheila Drysdale. Sydney, NSW: Coroners Court, 2016.
17. Berkowitz AL, Miller MB, Mir SA, Cagney D, Chavakula V, Guleria I, et al. Glioproliferative Lesion of the Spinal Cord as a Complication of "Stem-Cell Tourism". *The New England journal of medicine*. 2016 Jul 14;375(2):196-8.
18. Jung JW, Kwon M, Choi JC, Shin JW, Park IW, Choi BW, et al. Familial occurrence of pulmonary embolism after intravenous, adipose tissue-derived stem cell therapy. *Yonsei medical journal*. 2013 Sep;54(5):1293-6.
19. Pytel P, Husain A, Moskowitz I, Raman J, MacLeod H, Anderson AS, et al. Ventricular fibrillation following autologous intramyocardial cell therapy for inherited cardiomyopathy. *Cardiovascular pathology : the official journal of the Society for Cardiovascular Pathology*. 2010 Mar-Apr;19(2):e33-6.
20. Kishk NA, Abokrysha NT, Gabr H. Possible induction of acute disseminated encephalomyelitis (ADEM)-like demyelinating illness by intrathecal mesenchymal stem cell injection. *Journal of clinical neuroscience : official journal of the Neurosurgical Society of Australasia*. 2013 Feb;20(2):310-2.
21. Dlouhy BJ, Awe O, Rao RC, Kirby PA, Hitchon PW. Autograft-derived spinal cord mass following olfactory mucosal cell transplantation in a spinal cord injury patient: Case report. *Journal of neurosurgery Spine*. 2014 Oct;21(4):618-22.
22. Freitag J, Bates D, Boyd R, Shah K, Barnard A, Huguenin L, et al. Mesenchymal stem cell therapy in the treatment of osteoarthritis: reparative pathways, safety and efficacy - a review. *BMC musculoskeletal disorders*. 2016 May 26;17:230.
23. Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, Liberati A, et al. Explanation of the 2011 Oxford Centre for Evidence-Based Medicine (OCEBM) Levels of Evidence (Background Document). Oxford Centre for Evidence-Based Medicine. 2011.
24. Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, Liberati A, et al. The 2011 Oxford CEBM Evidence Levels of Evidence (Introductory Document). The Oxford Centre for Evidence-Based Medicine. 2011
25. Howick J, Chalmers I, Glasziou P, Greenhalgh T, Heneghan C, Liberati A, et al. The Oxford 2011 Levels of Evidence". Oxford Centre for Evidence-Based Medicine. 2011.