2016 consensus statement of the International Ankle Consortium: prevalence, impact and long-term consequences of lateral ankle sprains

Phillip A Gribble,[1] Chris M Bleakley,[2] Brian M Caulfield,[3] Carrie L Docherty,[4] François Fourchet,[5] Daniel Tik-Pui Fong,[6] Jay Hertel,[7] Claire E Hiller,[8] Thomas W Kaminski,[9] Patrick O McKeon,[10] Kathryn M Refshauge,[8] Evert A Verhagen,[11] Bill T Vicenzino,[12] Erik A Wikstrom,[13] Eamonn Delahunt[14]

For numbered affiliations see end of article.

Correspondence to
Dr Phillip A Gribble, Charles Wethington, Jr. Building, Room 206C, 900 South Limestone, College of Health Sciences, University of Kentucky, Lexington, KY 40536-0200, USA; phillip.gribble@uky.edu

Accepted 12 May 2016
Published Online First 3 June 2016

ABSTRACT

The Executive Committee of the International Ankle Consortium presents this 2016 position paper with recommendations for information implementation and continued research based on the paradigm that lateral ankle sprain (LAS), and the development of chronic ankle instability (CAI), serve as a conduit to a significant global healthcare burden. We intend our recommendations to serve as a mechanism to promote efforts to improve prevention and early management of LAS. We believe this will reduce the prevalence of CAI and associated sequelae that have led to the broader public health burdens of decreased physical activity and early onset ankle joint post-traumatic osteoarthritis. Ultimately, this can contribute to healthier lifestyles and promotion of physical activity.

INTRODUCTION

Lateral ankle sprain is the most common musculoskeletal disorder documented in physically active populations.[1–5] An acute lateral ankle sprain causes pain and typically results in a temporary period of reduced functioning and disability.[6] Early management and follow-up treatment can modulate the healing process and speed up return to desired activities.[7] Despite this fact, many patients receive neither supervised nor professionally administered care.[8] This suggests that, as an isolated injury occurrence, lateral ankle sprain is often considered an innocuous injury that will heal expediently and with minimal treatment. Unfortunately, the majority of patients with a history of lateral ankle sprain will sustain at least one additional sprain,[1 9–11] with many developing physical and subjective functional limitations, with ongoing 'giving-way' in the affected ankle,[6] resulting in the defined condition of chronic ankle instability.[12–14]

Our group has previously presented standards for defining chronic ankle instability,[15–17] documenting its prevalence and most consistent characteristics, to promote refined and focused efforts to research and treat chronic ankle instability. A history of lateral ankle sprain is common in the general population,[18] suggesting this is not just a problem among the young and physically active. Compounding the high percentage of the population that reports a history of lateral ankle sprain, is evidence of early onset post-traumatic osteoarthritis of the ankle;[19] along with decreases in physical activity levels[20–22] and health-related quality of life.[23–26] This illustrates that post-traumatic osteoarthritis of the ankle is a degenerative health issue that is not exclusive to middle-aged and elderly populations. Furthermore, the financial impact of lateral ankle sprain is high,[5 27 28] with billions spent annually on initial treatment and follow-up care. The negative consequence of lateral ankle sprain and chronic ankle instability are concerning, and improved efforts to address these conditions must be initiated.

Therefore, the Executive Committee of the International Ankle Consortium presents this position paper with recommendations for information implementation and continued research based on the proposition that lateral ankle sprains, and the development of chronic ankle instability, serve as a conduit to a significant global healthcare burden. We intend our recommendations to serve as a mechanism to promote efforts to improve prevention and early treatment of lateral ankle sprains. We believe this will reduce the prevalence of chronic ankle instability and associated sequelae that can lead to the broader public health burdens of decreased physical activity and early-onset post-traumatic osteoarthritis of the ankle. Ultimately, this can contribute to healthier lifestyles and promotion of physical activity. A comprehensive discussion of the supporting literature for our recommendations is found in a companion review paper that: (1) establishes the burden of lateral ankle sprains and (2) raises awareness of the mid-term and long-term negative consequences of lateral ankle sprains.[29]

SUMMARY AND RECOMMENDATIONS

Lateral ankle sprain is the most prevalent musculoskeletal injury in physically active populations as well as a common condition in the general population, and has numerous sequelae that contribute to a substantial healthcare burden. The treatment for lateral ankle sprain is quite variable, with many patients returning to activity in a short period of time;[30] however, half of those who incur a lateral ankle sprain may never seek initial treatment.

Injury recurrence rates following lateral ankle sprain are high, leading to a large percentage of patients developing chronic ankle instability.[31] Lingering ankle instability contributes to ongoing sensorimotor deficits and constrained functioning,

Linked

▶ http://dx.doi.org/10.1136/bjsports-2016-096189

CrossMark

To cite: Gribble PA, Bleakley CM, Caulfield BM, *et al*. *Br J Sports Med* 2016;**50**:1493–1495.

Br J Sports Med: first published as 10.1136/bjsports-2016-096188 on 3 June 2016. Downloaded from http://bjsm.bmj.com/ on April 18, 2024 by guest. Protected by copyright.

which associate with decreased physical activity and quality of life. Not surprisingly, patients with a history of lateral ankle sprain and chronic ankle instability dominate post-traumatic osteoarthritis cases, which comprise the majority of the ankle joint osteoarthritis surgical cases. Additionally, the onset of post-traumatic osteoarthritis of the ankle is happening relatively early in life.

While the direct costs for treatment of an isolated lateral ankle sprain are relatively low, compounding these costs are the indirect costs from follow-up care and injury-associated time loss. With a large percentage of the population experiencing this injury, the societal costs are high. As these treatment costs for lateral ankle sprains are combined with the costs of managing the loss of physical activity, and treatments for onset and care for post-traumatic osteoarthritis of the ankle, it becomes apparent that the healthcare burden that emerges from a 'simple' lateral ankle sprain is substantial.

In our companion evidence review paper, we have expanded on the premise we describe above, and introduce emerging areas that are in need of continued research.[29] From that extensive review, the Executive Committee of the International Ankle Consortium proposes the following recommendations for utilising our summary of information, as well as outlining the needs for specific future research. It is our opinion that implementing these recommendations will address this public healthcare burden to reduce the prevalence of lateral ankle sprains, as well as overcome deficits in those who sustain a lateral ankle sprain, ultimately improving the physical activity and quality of life in the sporting and general populations.

Recommendations

1. To reduce the prevalence of lateral ankle sprains, efforts are needed to promote the adoption and implementation of effective prevention protocols. A full review of the existing evidence is beyond the scope of this paper, but sports governing bodies, clinicians and researchers should strive to implement existing information that provides viable, proven solutions for lateral ankle sprain prevention.
2. Efforts should be implemented to encourage the use of a structured examination for patients presenting with a lateral ankle sprain. This should include appropriate clinical tests with the addition of imaging when necessitated. This will facilitate a correct diagnosis and appropriate treatment.
3. Efforts for initial treatment should include the acknowledgement of lateral ankle sprain as a noteworthy musculoskeletal injury that warrants treatment by a trained healthcare professional. Continued research is needed to determine the optimal treatment of lateral ankle sprain, to encourage return to activity levels and to lessen the chance for reinjury.
4. To reduce the high propensity for lateral ankle sprain recurrence and development of chronic ankle instability, clinicians and researchers should encourage proper follow-up with a standard of rehabilitation that addresses sensorimotor and arthrokinematic deficits, while simultaneously allowing for optimal tissue restoration. Continued research is needed to determine the optimal treatment protocols that address the critical deficits in these patients that lead to the development of chronic ankle instability.
5. Future research is needed to determine the onset timeline of ankle joint post-traumatic osteoarthritis of the ankle relative to lateral ankle sprain injury. Additionally, research is needed to determine what aberrant sensorimotor deficits contribute to the exacerbation of ankle joint degeneration and eventual development of post-traumatic osteoarthritis.
6. Future research is needed to determine the onset timeline of declines in physical activity and quality of life following initial lateral ankle sprain. This knowledge will help support the need for improved interventions (timing, dosage and intensity) to alleviate these declines.
7. Future research is needed to examine potential associations of lateral ankle sprains with comorbidity risk due to declines in physical activity and increased risk of post-traumatic osteoarthritis.
8. Direct and indirect financial and societal costs for treating lateral ankle sprains and their sequelae are high. Crude estimations based on prevalence and regional costs, along with extended timeline projections, make the potential costs staggering. Future research is needed to conduct comprehensive cost analyses from national and international perspectives. Confirming these cost projections from longitudinal studies will confirm the need for improved prevention and management efforts for lateral ankle sprains.

Author affiliations
[1]University of Kentucky, College of Health Sciences, Lexington, Kentucky, USA
[2]Department of Life and Health Sciences, Ulster University, Jordanstown, Carrickfergus, UK
[3]University College Dublin, Insight Centre for Data Analytics, Dublin, Ireland
[4]Indiana University, College of Public Health, Bloomington, Indiana, USA
[5]Physiotherapy Department, Hôpital La Tour, Geneva, Switzerland
[6]National Centre for Sport and Exercise Medicine—East Midlands, School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, Leicestershire, UK
[7]Departments of Kinesiology and Orthopaedic Surgery, University of Virginia, Charlottesville, Virginia, USA
[8]University of Sydney, College of Health, Sydney, New South Wales, Australia
[9]Department of Kinesiology and Applied Physiology, University of Delaware, Newark, Delaware, USA
[10]Department of Exercise and Sport Sciences, Ithaca College, Ithaca, New York, USA
[11]Department of Public and Occupational Health, VU University Medical Center, Amsterdam, The Netherlands
[12]University of Queensland, School of Health and Rehabilitation Sciences: Physiotherapy, Brisbane, Queensland, Australia
[13]Department of Exercise & Sport Science, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA
[14]University College Dublin, School of Public Health, Physiotherapy and Sports Science, Dublin, Ireland

Twitter Follow Phillip Gribble at @gribblepa, Evert Verhagen at @Evertverhagen and Erik Wikstrom at @ea_wikstrom

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1 Fong DTP, Hong YL, Chan LK, *et al*. A systematic review on ankle injury and ankle sprain in sports. *Sports Med* 2007;37:73–94.
2 Fong DT, Man CY, Yung PS, *et al*. Sport-related ankle injuries attending an accident and emergency department. *Injury* 2008;39:1222–7.
3 Hootman JM, Dick R, Agel J. Epidemiology of collegiate injuries for 15 sports: summary and recommendations for injury prevention initiatives. *J Athl Train* 2007;42:311–19.
4 Nelson AJ, Collins CL, Yard EE, *et al*. Ankle injuries among United States high school sports athletes, 2005–2006. *J Athl Train* 2007;42:381–7.
5 Waterman BR, Owens BD, Davey S, *et al*. The epidemiology of ankle sprains in the United States. *J Bone Joint Surg Am* 2010;92:2279–84.
6 van Rijn RM, van Os AG, Bernsen RM, *et al*. What is the clinical course of acute ankle sprains? A systematic literature review. *Am J Med* 2008;121:324–31.e6.
7 Kaminski TW, Hertel J, Amendola N, *et al*. National Athletic Trainers' Association position statement: conservative management and prevention of ankle sprains in athletes. *J Athl Train* 2013;48:528–45.
8 McKay GD, Goldie PA, Payne WR, *et al*. Ankle injuries in basketball: injury rate and risk factors. *Br J Sports Med* 2001;35:103–8.
9 Doherty C, Delahunt E, Caulfield B, *et al*. The incidence and prevalence of ankle sprain injury: a systematic review and meta-analysis of prospective epidemiological studies. *Sports Med* 2014;44:123–40.

Br J Sports Med: first published as 10.1136/bjsports-2016-096188 on 3 June 2016. Downloaded from http://bjsm.bmj.com/ on April 18, 2024 by guest. Protected by copyright.

10 Swenson DM, Yard EE, Fields SK, *et al*. Patterns of recurrent injuries among US high school athletes, 2005–2008. *Am J Sports Med* 2009;37:1586–93.
11 Yeung MS, Chan KM, So CH. An epidemiological survey on ankle sprain. *Br J Sports Med* 1994;28:112–16.
12 Delahunt E, Coughlan GF, Caulfield B, *et al*. Inclusion criteria when investigating insufficiencies in chronic ankle instability. *Med Sci Sports Exerc* 2010;42:2106–21.
13 Hertel J. Functional anatomy, pathomechanics, and pathophysiology of lateral ankle instability. *J Athl Train* 2002;37:364–75.
14 Hiller CE, Kilbreath SL, Refshauge KM. Chronic ankle instability: evolution of the model. *J Athl Train* 2011;46:133–41.
15 Gribble PA, Delahunt E, Bleakley C, *et al*. Selection criteria for patients with chronic ankle instability in controlled research: a position statement of the International Ankle Consortium. *Br J Sports Med* 2014;48:1014–18.
16 Gribble PA, Delahunt E, Bleakley C, *et al*. Selection criteria for patients with chronic ankle instability in controlled research: a position statement of the International Ankle Consortium. *J Orthop Sports Phys Ther* 2013;43:585–91.
17 Gribble PA, Delahunt E, Bleakley CM, *et al*. Selection criteria for patients with chronic ankle instability in controlled research: a position statement of the International Ankle Consortium. *J Athl Train* 2014;49:121–7.
18 Hiller CE, Nightingale EJ, Raymond J, *et al*. Prevalence and impact of chronic musculoskeletal ankle disorders in the community. *Arch Phys Med Rehabil* 2012;93:1801–7.
19 Golditz T, Steib S, Pfeifer K, *et al*. Functional ankle instability as a risk factor for osteoarthritis: using T2-mapping to analyze early cartilage degeneration in the ankle joint of young athletes. *Osteoarthr Cartil* 2014;22:1377–85.
20 Hubbard-Turner T, Turner MJ. Physical activity levels in college students with chronic ankle instability. *J Athl Train* 2015;50:742–7.
21 Hubbard-Turner T, Wikstrom EA, Guderian S, *et al*. An acute lateral ankle sprain significantly decreases physical activity across the lifespan. *J Sports Sci Med* 2015;14:556–61.
22 Simon JE, Docherty CL. Current health-related quality of life is lower in former Division I collegiate athletes than in non-collegiate athletes. *Am J Sports Med* 2014;42:423–9.
23 Arnold BL, Wright CJ, Ross SE. Functional ankle instability and health-related quality of life. *J Athl Train* 2011;46:634–41.
24 Houston MN, Hoch JM, Gabriner ML, *et al*. Clinical and laboratory measures associated with health-related quality of life in individuals with chronic ankle instability. *Phys Ther Sport* 2015;16:169–75.
25 Houston MN, Hoch JM, Hoch MC. Patient-reported outcome measures in individuals with chronic ankle instability: a systematic review. *J Athl Train* 2015;50:1019–33.
26 Houston MN, Van Lunen BL, Hoch MC. Health-related quality of life in individuals with chronic ankle instability. *J Athl Train* 2014;49:758–63.
27 Knowles SB, Marshall SW, Miller T, *et al*. Cost of injuries from a prospective cohort study of North Carolina high school athletes. *Inj Prev* 2007;13:416–21.
28 Verhagen EA, van Tulder M, van der Beek AJ, *et al*. An economic evaluation of a proprioceptive balance board training programme for the prevention of ankle sprains in volleyball. *Br J Sports Med* 2005;39:111–15.
29 Gribble P, Bleakley C, Caulfield B, *et al*. Evidence review for the 2016 international ankle consortium consensus statement on the prevalence, impact and long-term consequences of lateral ankle sprains. *Br J Sports Med* 2016;[in press].
30 Medina McKeon JM, Bush HM, Reed A, *et al*. Return-to-play probabilities following new versus recurrent ankle sprains in high school athletes. *J Sci Med Sport* 2014;17:23–8.
31 Doherty C, Bleakley C, Hertel J, *et al*. Recovery from a first-time lateral ankle sprain and the predictors of chronic ankle instability: a prospective cohort analysis. *Am J Sports Med* 2016;44:995–1003.

Br J Sports Med: first published as 10.1136/bjsports-2016-096188 on 3 June 2016. Downloaded from http://bjsm.bmj.com/ on April 18, 2024 by guest. Protected by copyright.