

APKASS Consensus Statement on Chronic Syndesmosis Injury, Part 3

Fusion Techniques, Comorbidity Treatments, Postoperative Rehabilitation, and Return-to-Sport Indications

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Background: Questions regarding surgical fusion techniques, postoperative treatment, and indications for return to sport after chronic syndesmosis injury or its comorbidities remain unanswered.

Purpose: An international group of experts representing the field of injuries in the foot and ankle area was invited to collaboratively advance toward consensus opinions based on the best available evidence regarding chronic syndesmosis injury. All were members of the Asia-Pacific Knee, Arthroscopy and Sports Medicine Society (APKASS).

Study Design: Consensus statement.

Methods: From November to December 2020, a total of 111 international experts on sports medicine or ankle surgery participated in a 2-stage Delphi process that included an anonymous online survey and an online meeting. A total of 13 items with 38 statements were drafted by 13 core authors. Of these, 4 items with 6 clinical questions and statements were related to surgical fusion techniques, comorbidity treatments, postoperative rehabilitation, and return-to-sports indications and are presented here. Each statement was individually presented and discussed, followed by a general vote. The strength of consensus was characterized as follows: consensus, 51% to 74%; strong consensus, 75% to 99%; and unanimous, 100%.

Results: Of the 6 questions and statements, 5 achieved unanimous support and 1 reached strong consensus.

Conclusion: This APKASS consensus statement, developed by international experts in the field, will assist surgeons and physical therapists with surgical and postoperative treatment strategies for chronic syndesmosis injury.

Keywords: syndesmosis injury; ankle; surgical treatment; rehabilitation; consensus

Syndesmosis injuries of the ankle are relatively frequent in the general and athletic population and, if not managed properly, have the potential to comprise a long recovery process, even leading to chronic instability and late arthrosis.²⁴ Chronic syndesmosis injury is classified as presenting >6 months after trauma.^{3,24} Despite the fact that many surgical techniques have been described in the literature, little evidence is available with regard to the indications, procedures, and outcomes of fusion techniques or how to manage with combined disorders.¹⁹ As for postoperative rehabilitation protocol, it remains controversial that if it should be related to screw removal decision: some authors advocate removal of

the screws before weightbearing,^{1,4} while others suggest no significant difference in outcome between the retained and removed screws.^{8,16} On the other hand, chronic syndesmosis injury presents a significant challenge for athletes especially, where early return to sport is of great importance. However, to date it is difficult to ascertain a standardized recovery period measure before return to sport.

Experts from the Asia-Pacific Knee, Arthroscopy and Sports Medicine Society (APKASS) convened to develop expert- and evidence-based consensus statements in order to assist surgeons and physical therapists in the management of this challenging disorder. The purpose of this article was to report the results of discussions regarding surgical fusion techniques, comorbidity treatments, postoperative rehabilitation, and return-to-sports indications that took place at the 2020 APKASS

international consensus meeting on chronic syndesmosis injury.

METHODS

A core group of 13 authors drafted and refined 13 items consisting of 38 clinical questions and statements, which were then assigned to at least 1 of the authors to research and summarize the currently available evidence. Our consensus methodology was designed using a 2-stage Delphi process, which included an online survey (November 20, 2020; stage 1) and an online meeting (December 20, 2020; stage 2). The final document we sent out for stage 1 of the consensus process featured 8 items and 29 statements (available as Supplemental Material). Each statement was individually presented and discussed, followed by a general vote.

Stage 1

We invited 21 experts to fill out the online questionnaire (www.surveymonkey.com). For each of the 29 statements, the experts could respond with *agree*, *disagree*, or *don't know/not sure*, as well as submit optional comments. One author (Y.S.) compiled the survey results and shared them with the core author group for analysis. Statements that achieved consensus (67%, or a two-thirds supermajority) were not discussed further. Consensus was reached on 19 of the 29 initial statements.

Stage 2

Besides the core group of 13 authors, 98 experts in the field attended the online meeting via Zoom. The remaining 5 items (9 statements) underwent voting per stage 1, then all statements that did not achieve consensus after the online survey were displayed and discussed using PowerPoint (Microsoft Corp) by each responsible author, after which 1 of the following 2 steps were taken:

Step 1. If inconsistent opinions were proposed and supported by 2 additional participants during the discussion, modification was required and an amendment motion was made, and the statement was modified if the proportion of votes in favor of doing so was $\geq 67\%$.

Step 2. When the participating 111 experts did not propose any further modifications, the group voted for or against the statement. If the proportion of favorable votes was $\leq 50\%$, the statement was excluded from the overall consensus statement. If the proportion of favorable votes was $> 50\%$, the statement was passed and was included in the overall consensus statement. The strength of consensus was characterized as follows: 51% to 74% indicated consensus; 75% to 99% indicated strong consensus; and 100% indicated unanimous consensus.

A draft of the manuscript was circulated to all 13 core authors, and all comments/edits were incorporated.

RESULTS

Of the 8 total clinical questions in this section, 2 were excluded because of redundant information; of the remaining 6 statements, 5 reached unanimous support and 1 achieved strong consensus.

Item 10: Indication, Methods, and Outcomes of Fusion

Statement: Syndesmosis arthrodesis can be considered in chronic cases with arthritic changes or severe diastasis. Malreduction should be treated at the same time of arthrodesis when present. Open or arthroscopic arthrodesis have been described but there is no conclusion regarding which approach is superior.

Vote: Agree 100% (unanimous)

Item 11: Treatment Strategy for Chronic Syndesmosis Injury Combined With Medial/Lateral Ankle Instability

Question 1: Is debridement necessary for combined medial/lateral ankle instability due to ankle ligaments rupture?

Response: Debridement of scar tissue and fibrosed remnant of ligaments is vital in the surgical procedure of chronic syndesmosis injury combined with medial/lateral ankle instability due to ankle ligaments rupture with any obvious instability.

Vote: Agree 100% (unanimous)

Question 2: Is tibiofibular arthrodesis necessary for combined lateral ankle instability due to fibular malunion or nonunion?

Response: Syndesmosis reduction and arthrodesis plus restoration of fibular anatomy is recommended for chronic

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Final revision submitted March 30, 2021; accepted April 20, 2021.

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syndesmosis injury with arthritis combined with lateral ankle instability due to fibular malunion or nonunion.

Vote: Agree 100% (unanimous)

Item 12: Postoperative Rehabilitation

Statement 1: Regarding rehabilitation, patients are allowed to undertake range of motion (ROM) exercises without weight-bearing within 1 to 2 weeks of diastasis fixation. This is then followed with gradual weightbearing, with patients returning to full activity at around 6 weeks after fixation.

Vote: Agree 78.6% (strong consensus)

Statement 2: Regarding the removal of diastasis screw(s), overall, there are no significant differences between retained or removed screws.

Vote: Agree 100% (unanimous)

Item 13: Indications for Return to Sport

Statement: A rehabilitation program for return to sport according to different surgical methods should be developed, with specialized questionnaires.

Vote: Agree 100% (unanimous)

DISCUSSION

A total of 6 statements on fusion techniques, comorbidity treatments, postoperative rehabilitation, and return-to-sports indications of chronic syndesmosis injury reached consensus. Two of the initial questions were removed because of redundancy in the information. Ultimately, 5 statements reached unanimous support and 1 achieved strong consensus.

With respect to fusion techniques, Espinosa et al⁵ recommended open arthrodesis for a chronic syndesmosis injury, and Katznelson et al⁹ performed arthrodesis of the distal tibiofibular joint in 5 patients. Among those patients, 4 achieved a full ROM of the ankle joint without pain at 1 year after surgery. Ribbans et al¹⁹ demonstrated that distal tibiofibular fusions were rare, with the following indications being the most common: salvage following syndesmotom injury with a chronic, symptomatic diastasis following Weber B and C and ankle fractures or, more rarely, isolated chronic syndesmotom injuries with instability. Miyamoto and Takao¹³ recommended arthrodesis of the distal tibiofibular joint for chronic cases. There is no clarification as to whether obliteration of distal tibiofibular joint motion will lead to deteriorated ankle joint function in the future. This is because there appears to be no report illustrating the clinical and functional results of arthrodesis of the distal tibiofibular joint after long-term follow-up.

Lui¹¹ recommended the supine position for ankle arthroscopy and the floppy lateral position for syndesmosis endoscopy. Ankle arthroscopy with conventional anteromedial and anterolateral portals can only debride and prepare the anterior aspect of the syndesmosis. An extra-articular syndesmosis endoscopy with a proximal anterolateral portal and proximal posterolateral portals can help visualize and prepare the entire syndesmosis surface. Lui¹⁰ also reported 5 surgical aims in syndesmosis arthrodesis: (1) allow reduction of the syndesmosis by adequate soft tissue release; (2)

complete removal of the interosseous ligament and scar tissue in the syndesmosis to allow adequate preparation of the fusion surfaces; (3) anatomic reduction of the syndesmosis; (4) bone grafting of the gap at the fusion site; and (5) adequate and protected immobilization internally using syndesmotom screws and externally using casting. The same surgical principals as those required for an open surgical approach should be achieved by the arthroscopic approach.

In terms of comorbidity managements, Han et al⁷ performed arthroscopic debridement with or without transfixation for patients with chronic syndesmosis injury due to ankle lateral ligament rupture, and 90% of patients reported satisfaction levels of good or excellent. They considered that the cause of symptoms in patients with distal tibiofibular syndesmosis injury was not due to instability of the distal tibiofibular joint but to impaction of hypertrophied soft tissue within the distal tibiofibular joint. Pritsch et al¹⁸ reported the presence of the syndesmotom adhesions had also been implicated as a source of chronic pain in syndesmotom injuries. They treated 11 patients with chronic ankle pain 6 to 9 months after ankle fracture. All had pain relief and return to preoperative functional capacity after aggressive arthroscopic excision of syndesmotom adhesions. Also, Wager et al²⁵ found that the nonphysiological tissue would limit motion and result in impingement of the hypertrophied tissue against the lateral talar dome in dorsiflexion.

Olson et al¹⁷ evaluated 10 consecutive patients who underwent reduction and arthrodesis of the distal tibiofibular articulation to treat chronic syndesmosis instability. All patients had fibular nonunion or malunion indicating presence of lateral instability. Before reduction and internal fixation for arthrodesis of syndesmosis, malunion of the fibula was corrected with either a lengthening or a combined osteotomy at the location of the deformity, and nonunion of the fibula was treated with debridement and restoration of anatomical alignment. Significant changes were observed in the medial clear space, valgus tilting of the talus, and talocrural angle, which indicated that the reconstruction improved the alignment and congruity of the ankle mortise and restored fibular length. All patients showed satisfaction with and a willingness to undergo the procedure again. Katznelson et al⁹ reported in their case series of 5 patients that all patients had no pain after arthrodesis of the distal tibiofibular. Clare and Berkowitz² reported that tibiofibular arthrodesis could produce a nonphysiological stiffness of the ankle mortise preventing the fibula from its normal movements and thus restricting talar movement and limiting ankle movement.

On average, the syndesmosis takes 8 to 12 weeks to repair. There is no consensus on whether to allow weight-bearing before removal of the screw or the duration that screws should remain in situ. The difficulty with weight-bearing while the screws are in situ is the increased risk of loosening, breakage, and pain. A 2011 review²⁰ looked at 7 studies (1 randomized controlled trial [RCT], 1 quasi-RCT, and 5 retrospective studies) with a total of 472 patients; of these, 80 had broken or loose diastasis screws. Overall, there were no significant differences between retained or removed screws. Removal of diastasis screw(s) that are not broken at 4 to 6 months has been

recommended in symptomatic patients. In addition, removal of diastasis screws carries a 22.4% complication rate, encompassing infection (9.6%), reoccurrence of diastasis (6.6%), and screw breakage during removal (6.6%).²¹ Some clinicians do not routinely remove syndesmotic screws.¹²

Taylor et al²³ evaluated athletes with syndesmotic sprains who underwent fixation with diastasis screws. In this case series, patients were allowed to undertake ROM exercises within 1 week of diastasis fixation. This was then followed by gradual weightbearing, with patients returning to full activity on average 41 days after fixation. This cohort evidenced no screw breakage during full activity or before removal. Hamid et al⁶ found that patients with broken screws had an optimum clinical outcome in comparison with those with intact or removed syndesmotic screws and advocated leaving the syndesmotic screws in situ indefinitely. In this study, 68% of the patients had evidence of radiolucency around the diastasis screw, which may indicate micromovements occurring, although this had no effect on the overall clinical outcome.

Few studies have reported the indications for return to sport, attributed to extent or type of injury, various surgical methods, requirements for exercise intensity, compliance, and individual physical condition. However, time to weightbearing was found to be significantly shorter for patients who received dynamic fixation when compared with those who received static fixation.^{15,22} Morris et al¹⁴ recommended at least 6 months before return to full sporting activity after performing a dynamic fixation procedure. It is known that an individualized rehabilitation protocol helps patients to return to sports early; this should be formulated by the surgeons and therapists. In addition, subjective criteria including clinical examination, imaging manifestation, and an observational test are necessary. Furthermore, a questionnaire is easier for patients to accept and cooperate and for surgeons to implement. Patients are advised to use a removable walking boot, thereby immobilizing in the early postoperative phase and enabling progressive weightbearing as well as therapy to increase ROM. After a short time of immobilization, early ROM is commonly used to hasten return to sports. Patients without pain or limitation are allowed to strengthen functional exercise until they return to a lower preinjury level. Athletic activities should be taken up on an individual schedule, with coordination, muscular endurance, and motor control. Advanced training is directed at returning to the preinjury sports level by increasing strength, neuromuscular control, and sport-specific tasks.²⁶

CONCLUSION

The 4 items with 6 clinical questions and statements in this consensus statement focused on the surgical treatment, comorbidity management, postoperative rehabilitation, and return-to-sports indications for chronic syndesmosis injury and may be beneficial for clinicians in the management of this challenging disorder.

Supplemental material for this article is available at <http://journals.sagepub.com/doi/suppl10.1177/23259671211021059>

ACKNOWLEDGMENT

The authors acknowledge the following for their participation: Jun Chen, MD (Dongyang People's Hospital, Wenzhou Medical University, China); Bo Feng, MD (The Third Clinical Medical College of Inner Mongolia Medical University, China); Fulong Gu, MD (Nantong Traditional Chinese Medicine Hospital, China); Xueping Gu, MD (The Affiliated Suzhou Hospital of Nanjing Medical University, China); Qinglin Han, MD (The Affiliated Hospital of Nantong University, China); Yuefeng Hao, MD (The Affiliated Suzhou Hospital of Nanjing Medical University, China); Jiang Heng, MD (Tianxiang East Hospital, China); Dong Jiang, MD, PhD (Peking University Third Hospital, China); Dongliang Shi, MD (Yangzhi Rehabilitation Hospital, Tongji University School of Medicine, China); Jin Su Kim, MD (Sejong Sports Medicine and Sports Performance Center, Republic of Korea); Hak Jun Kim, MD (Korea University College of Medicine, Republic of Korea); Jiaping Lan, MD (Suining Central Hospital, China); Lei Li, MD (Suining Central Hospital, China); Fei Li, MD (The 1st Hospital of Tsinghua University, China); Ding Li, MD (The 2nd Xiangya Hospital, Center South University, China); Yi Liu, MD (Guangdong Provincial Hospital of Traditional Chinese Medicine, China); Wei Luo, MD (Longkou Traditional Chinese Medicine Hospital, China); Kwang Hwan Park, MD (Yonsei University, Republic of Korea); Jae Yong Park, MD (Hallym University Sacred Heart Hospital, Republic of Korea); Yan Qi, MD (Yangzhi Rehabilitation Hospital, Tongji University School of Medicine, China); Yuanyuan Qian, MD (The First People's Hospital of Changshu City, China); Zilong Sheng, MD (Beijing Huairou Hospital, China); Bin Song, MD (Sun Yat-Sen Memorial Hospital, China); Tong Su, MD (Peking University Third Hospital, China); Xu Tao, MD (Luzhou Traditional Chinese Medicine Hospital, China); Nattachai Thaengthong, MD (Sakaeo Crown Prince Hospital, Thailand); Yiran Wang, MD (Huashan Hospital, Fudan University, China); Shaoshan Wang, MD (Shandong Provincial Hospital of Traditional Chinese Medicine, China); Bin Wu, MD (Shanghai Jiangong Hospital, China); Hansong Xia, MD (The 3rd Xiangya Hospital, Central South University, China); Qian Xu, MD (910th Hospital of PLA, China); Guoyong Yang, MD (No. 1 Orthopedics Hospital of Chengdu, China); Zhengshuang Yue, MD (Xiaoshan TCM Hospital, China); Kexiang Zhang, MD (The 3rd Xiangya Hospital, Central South University, China); Xiaoming Zhao, MD (The People's Hospital of Lishui District, China); Yuan Zhu, MD (Shanghai Ruijin Hospital Foot and Ankle Center, Shanghai Jiaotong University, China); Chuan He, MD (The First Affiliated Hospital of Kunming Medical University, China); Qianru Li, MD

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