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## Keynote Review

### APKASS consensus statement on chronic syndesmosis injury

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Experts from the Asia-Pacific Knee, Arthroscopy and Sports Medicine Society (APKASS) convened to develop expert- and

APKASS Consensus Statement on Chronic Syndesmosis Injury, Part 1: Clinical Manifestation, Radiologic Examination, Diagnosis Criteria, Classification, and Nonoperative Treatment (DOI: 10.1177/23259671211021057, *Orthop J Sports Med*, 9(6), 23259671211021057)

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These three articles are a further expansion of this summary article, adding a detailed description of the discussion and development of consensus.

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2214-6873/© 2021 Asia Pacific Knee, Arthroscopy and Sports Medicine Society. Published by Elsevier (Singapore) Pte Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

evidence-based consensus statements in order to assist surgeons and physical therapists in the management of chronic syndesmosis injury. The purpose of this article was to report the results that took place at the 2020 APKASS international consensus meeting on this challenging disorder.

## 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](http://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 Power Point (Microsoft Corp) by each responsible author, after which one 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 67% or greater.

**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 50% or less, the statement was excluded from the overall consensus statement. If the proportion of favorable

votes was greater than 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 40 total clinical questions in this consensus, 2 were excluded because of redundant information; of the remaining 38 statements, 14 achieved unanimous support, 22 reached strong consensus, and 2 reached consensus.

### Item 1: clinical manifestation and presentation

**Statement:** Signs and symptoms of chronic syndesmosis injury are nonspecific. A high index of suspicion is warranted for symptomatic posttraumatic ankle pain. Radiological syndesmosis malreduction may be underreported, but its clinical significance is debated.

**Vote:** Agree 100% (unanimous)

### Item 2: imaging examination including radiography, computed tomography, ultrasonography, and magnetic resonance imaging

**Question 1:** How to reveal latent instability at the syndesmosis?

**Response:** Magnetic resonance imaging (MRI) combined with the other imaging modalities could have the possibility to diagnose instability less invasively compared to arthroscopy.

**Vote:** Agree 95.2% (strong consensus)

**Question 2:** What is known about ultrasonography to diagnose syndesmosis injury?

**Response:** There have been few reports about ultrasonography. It could be a reliable method because dynamic stress examination could be performed to detect a disruption of the anterior inferior tibiofibular ligament (AITFL) by experienced sonographers and doctors. However, it may be less effective for assessing the interosseous membrane and posterior inferior tibiofibular ligament (PITFL).

**Vote:** Agree 100% (unanimous)

**Question 3:** Is MRI the most reliable imaging method?

**Response:** MRI is one of the most reliable methods. Combined with other examinations, MRI is helpful to diagnose chronic syndesmosis instability. However, the detection of the injured ligaments on MRI becomes less reliable with time.

**Vote:** Agree 95.7% (strong consensus)

### Item 3: diagnosis criteria, types, and classifications for chronic syndesmosis injury

**Question 1:** How to classify chronic syndesmosis injury thorough medical history and physical examination?

**Response:** No definite diagnosis and classification can be made for chronic syndesmosis injury based on medical history and physical examination.

**Vote:** Agree 90.5% (strong consensus)

**Question 2:** How to classify chronic syndesmosis injury based on the involved structures?

**Response:** The grading and the classification of chronic syndesmosis injury can be made based on the involved structures. The sequence is usually from the AITFL, interosseous ligament, and interosseous membrane, PITFL to the deltoid ligament.

**Vote:** Agree 85.7% (strong consensus)

**Question 3:** What are the criteria and selection of radiological examination for chronic syndesmosis injury?

**Response:** Radiographs should be the first option for evaluating chronic syndesmosis injury. With significantly higher sensitivity, MRI should be done for the suspected syndesmosis injury which can not be detected on radiograph or computed tomography (CT).

**Vote:** Agree 96.4% (strong consensus)

**Question 4:** How to diagnose and classified chronic syndesmosis injury on radiographs?

**Response:** Tibiofibular clear space (TFCS) and tibiofibular overlap (TFO) on radiography can be used to aid in the diagnosis of syndesmosis injury, but should not be solely relied on for determining syndesmosis stability and treatment strategies.

**Vote:** Agree 100% (unanimous)

**Question 5:** What are the criteria for CT and weightbearing CT?

**Response:** Published studies have used different measurements of linear distance to identify an increased separation across the syndesmosis or a malalignment between the tibia and fibula.

**Vote:** Agree 90.5% (strong consensus)

**Question 6:** What are the criteria for chronic syndesmosis injury on MRI?

**Response:** The direct criteria include absent ligament, abnormal course, wavy, irregular thickening, and abnormal increased signal on axial MRI and lambda sign on coronal MRI.

**Vote:** Agree 100% (unanimous)

**Question 7:** How to define chronic syndesmosis injury?

*Response:* A syndesmotic injury can be classified as acute, sub-acute, and chronic based on the time duration of the symptoms.

*Vote:* Agree 95.2% (strong consensus)

*Question 8:* How to define the type of chronic syndesmosis injury?

*Response:* Under the traditional classification standard, chronic syndesmosis injury can be categorized into stable sprain, latent diastasis, and frank diastasis on basis of radiography. However, with the popularization of MRI and arthroscopy, it is important to build an adapted classification system, which requires further research and clinical validation.

*Vote:* Agree 95.2% (strong consensus)

*Question 9:* How to diagnose and classify chronic syndesmosis injury via arthroscopy?

*Response:* The cutoff for the diagnosis of syndesmosis instability is recommended as 3.0 mm of the length of the opening in the dissector. A grading system should be easily applicable and should help predict the clinical outcomes to play a guiding role in choosing surgical treatment options.

*Vote:* Agree 76.2% (strong consensus)

#### *Item 4: indications, methods, and outcomes for nonoperative treatment*

*Statement 1:* Regarding management of syndesmotic injuries without an ankle fracture, symptomatic syndesmotic sprain with no diastasis or joint instability on imaging evaluations should be managed nonoperatively with a nonweightbearing cast.

*Vote:* Agree 100% (unanimous)

*Statement 2:* It should be noted that syndesmotic injuries without a fracture that are treated nonoperatively mostly take longer to heal.

*Vote:* Agree 75% (strong consensus)

#### *Item 5: indications for surgery*

*Question 1:* When should be stabilized surgically?

*Response:* Surgical treatment should be considered whenever syndesmosis instability is diagnosed with imaging or arthroscopy.

*Vote:* Agree 100% (unanimous)

*Question 2:* Is early stabilization recommended to return to sports for athletes?

*Response:* It is not for all but for some athletes who hope for early return to play, early arthroscopic assessment (with or without stabilization) may be preferred.

*Vote:* Agree 81.8% (strong consensus)

*Question 3:* What are the indications for surgery in patients with generalized joint hypermobility (GJH)?

*Response:* We need further study for patients with GJH, and need to take care when we perform the reconstruction.

*Vote:* Agree 95.5% (strong consensus)

#### *Item 6: is arthroscopic/open debridement necessary for chronic syndesmosis injury?*

*Question 1:* Is scar tissue one of the sources of the clinical symptoms in patients with chronic syndesmosis injury?

*Response:* Scar tissue in the distal tibiofibular joint is one of the sources of clinical symptoms including pain, swelling, stiffness,

and limited dorsiflexion of the ankle joint in patients with chronic syndesmosis injury.

*Vote:* Agree 90.5% (strong consensus)

*Question 2:* Are there any positive signs during physical examination to evaluate scar tissue in patients with chronic syndesmosis injury?

*Response:* During physical examination, persistent tenderness and swelling in the anterolateral aspect of the ankle joint syndesmosis combined with squeeze test or external rotation test indicates the presence of scar tissue in syndesmosis.

*Vote:* Agree 94.4% (strong consensus)

*Question 3:* Can we evaluate syndesmosis scar tissue by image examination?

*Response:* The size and location of scar tissue can be evaluated by preoperative magnetic resonance imaging (MRI).

*Vote:* Agree 71.4% (consensus)

*Question 4:* Is debridement necessary?

*Response:* Debridement can achieve better reduction and improve clinical outcomes.

*Vote:* Agree 81.0% (strong consensus)

*Question 5:* How should debridement be performed?

*Response:* The technique of syndesmosis debridement can be performed as follows: Firstly, the medial gutter is debrided. Secondly, the syndesmosis is debrided from the syndesmosis and down to the ankle joint until the articular cartilage of the talar dome is visible.

*Vote:* Agree 90.5% (strong consensus)

*Question 6:* Should we choose arthroscopic or open debridement?

*Response:* There is no consistent conclusion for the debridement technique. We can choose either arthroscopic or open debridement during the operation.

*Vote:* Agree 90.5% (strong consensus)

*Question 7:* Is debridement alone enough?

*Response:* Syndesmosis debridement alone can achieve good outcomes for patients with no obvious medial ankle instability and lateral displacement of the talus and for patients with separation less than 5 mm.

*Vote:* Agree 66.7% (consensus)

#### *Item 7: how should screw fixation be chosen?*

*Response 1:* Regarding the selection of screw size for the surgical fixation of syndesmotic diastasis, both 3.5- and 4.5-mm cortical screws exhibit similar biomechanical characteristics and there does not seem to be any superiority of the 4.5-mm over the 3.5-mm cortical screw in fixation of the syndesmosis. The decision appears to depend on surgeons' experience and preference.

*Vote:* Agree 100% (unanimous)

*Response 2:* The use of 4.5-mm screw on 4 cortices gives considerable support against shear stresses applied to the distal syndesmosis during weightbearing.

*Vote:* Agree 88.2% (strong consensus)

*Response 3:* Two screws should be used in cases of unstable injury with a high degree of instability, such as high fibular fractures (Maisonneuve fracture).

*Vote:* Agree 82.4% (strong consensus)

#### *Item 8: suture button vs screw fixation*

*Statement:* Suture buttons generally provide less rigid fixation compared to screw fixation, especially in sagittal motion, unless a double divergent pattern is utilized. However clinical

translation of this biomechanical findings is equivocal. Suture buttons theoretically negate the need for routine implant removal, but there have been reports of it causing skin impingement.

Vote: Agree 85.7% (strong consensus)

#### Item 9: indications, methods, and outcomes for reconstruction

**Question 1:** Is it necessary to reconstruct each ligament? Is only reconstruction of the anterior inferior tibiofibular ligament (AITFL) enough?

**Response:** We need to diagnose the injured ligaments preoperatively or intraoperatively, and to perform appropriate reconstruction simultaneously.

Vote: Agree 100% (unanimous)

**Question 2:** Do suture button constructs sufficiently restore ankle stabilization?

**Response:** With clamp to maintain syndesmosis reduction, 2 divergent suture buttons tightened maximally by hand and the AITFL augmentation with suture tape is ideal to restore syndesmosis stability.

Vote: Agree 85.7% (strong consensus)

**Question 3:** Is it necessary to repair the deltoid ligament?

**Response:** If the medial instability is combined, deltoid ligament repair or reconstruction with syndesmosis reconstruction may accelerate postoperative rehabilitation.

Vote: Agree 100% (unanimous)

#### 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 fibula malunion or nonunion?

**Response:** Syndesmosis reduction and arthrodesis plus restoration of fibular anatomy is recommended for chronic syndesmosis injury with arthritis combined with lateral ankle instability due to fibula malunion or nonunion.

Vote: Agree 100% (unanimous)

#### Item 12: postoperative rehabilitation

**Statement 1:** Regarding rehabilitation, patients are allowed to undertake range of motion exercises without weightbearing within 1–2 weeks of diastasis fixation. This is then followed

with gradual weightbearing, with patients returning to full activity at around 6 weeks postfixation.

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)

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All authors declare that they have no conflict of interest.

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#### **Appendix A. Supplementary data**

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.j.asmart.2021.05.008>.