INTRODUCTION

The methodologic standards for publication in the orthopaedic literature have become increasing more rigorous. Large sample sizes, now used to adequately power statistical analysis, have necessitated pooling of resources between the investigators who practice at different institutions, and even in different countries. Consistency of arthroscopic evaluation and documentation of meniscal tears between surgeons is essential to valid assessment of treatment for meniscal tears. Poor agreement between surgeons on meniscal tear grading may invalidate the findings of even the most rigorously conducted clinical trial.

Sensitive to these issues, the ISAKOS Knee Committee formed a meniscal documentation subcommittee in 2006 with the objective of developing a reliable, international meniscal evaluation and documentation system to facilitate outcomes assessment.

METHODS

The members of the ISAKOS Meniscal Documentation Committee were selected by the leadership of AOSSM, APOSSM, ESSKA, and SLARD. The members of the committee included Chairman, Allen F. Anderson; Brian Cole and Kurt Spindler representing the AOSSM; Kazunori Yasuda, representing the APOSSM; Philippe Beaufils, Philippe Neyret, and Rene Verdonk representing ESSKA; Jay Irrgang, Robert Johnson, and Warren Dunn representing ISAKOS and Moisés Cohen representing SLARD.

At the initial meeting the committee discussed the three types of forms that may be used to evaluate and document meniscal tears: A patient-reported (subjective) outcomes form, knee examination form, and surgical documentation form. The consensus of the committee was the development of a patient-reported outcomes form was not feasible or necessary. The development of such a form would be prohibitively expensive and take five years to develop. The committee agreed to adopt the IKDC Subjective Knee Form, which has been shown to be valid and responsive for evaluation of meniscal treatment outcomes.

The committee placed a low priority on development of a knee examination form. Interobserver differences, including how tests were performed and interpreted, makes it impossible to validate the objective metrics of meniscal examination.

The primary objective of the initial meeting was to develop a surgical documentation form. The first step was to agree on standard terminology for the following:

- Tear length indicates the length of a meniscal tear that reaches the surface of the meniscus. Intrameniscal degeneration or contained tears, i.e. those that do not reach the surface of the meniscus, are not included in the definition of tear length.

- Tear depth mirrors the MRI classification scheme of 0 to 3. A 3A tear is a partial tear of either the superior or surface of the meniscus. A horizontal tear may also be a partial tear. A 3B tear is a tear that extends through both the superior and inferior surfaces of the meniscus.

- Radial location was divided into anterior, mid and posterior classification, which divides the meniscus into thirds. Rim width locations include: Zone 1 (tears of the meniscosynovial junction or a tear with a rim of less than 3 mm), Zone 2 (tears with a rim of 3 to < 5 mm), and Zone 3 (tears with a rim width of 5 mm or more). The committee discourages the use of the terms red-red, red-white, white-white, because of the vascular supply of the menisci varies and cannot be precisely determined by rim width alone.

The committee agreed to the following terms for tear patterns:

- Longitudinal-vertical (an extension of this is a bucket handle tear), horizontal, radial, vertical flap, horizontal flap, and complex. The quality of the tissue may be non-degenerative, degenerative or undetermined. The committee also discourages the use of the terms acute, subacute, and chronic in preference to the time since onset of symptoms.

PILOT STUDY

The next step in developing the meniscal documentation form was to perform a pilot study to quantify interobserver agreement for tear length, tear depth, location, pattern, quality of the tissue and the amount of meniscus excised. Eight members of the committee independently evaluated ten 45-second arthroscopic videos of meniscal tears. The instruction sheet was changed based on the responses.

INTEROBSEVER RELIABILITY STUDY

International interobserver reliability was determined by eight experienced orthopaedic surgeons who were not members of the committee. These surgeons practice in eight countries (Australia, Belgium, Brazil, France, Italy, Japan, and the United States) and they were members of the four continental sports medicine societies: AOSSM, APOSSM, ESSKA and SLARD.
Thirty-seven arthroscopic videos, 45-seconds in length, were graded by the surgeons. Interobserver reliability was determined by calculating the observed agreement and multi-rater Kappa statistics. The observed agreement was 88% (Kappa 0.52, moderate) for tear depth; 54% (Kappa 0.25, slight) for rim width; 68% (Kappa 0.46, moderate) for anterior-middle-posterior location; 67% (Kappa 0.36, slight) for central to the popliteal hiatus; Kappa 0.83, excellent for tear length; 72% (Kappa 0.47, moderate), for quality of the tissue; and Kappa 0.63, substantial, for percent of the meniscus excised.

CONCLUSION:
The interobserver reliability was acceptable for tear depth, location, tear pattern, length, quality of tissue and percent of the meniscus excised. Caution should be used when interpreting the results based on rim width and if the tear is central to the popliteal hiatus. The ISAKOS classification of meniscal tears provides sufficient interobserver reliability for pooling of data from international clinical trials designed to evaluate the outcomes of treatment for meniscal tears.

ISAKOS CLASSIFICATION OF MENISCAL TEARS

Instructions
Evaluate tears based on the following criteria:

1. Tear depth—the partial tear extends through either the superior or inferior surface of the meniscus. A horizontal tear may also be a partial tear. The complete tear extends through both the superior and inferior surfaces of the meniscus.

2. Rim Width
   a. In the zone classification tears may involve more than one zone. The tears should be graded based on how far the tear extends into the meniscus. For example, a complete radial tear that extends through zones 3, 2, and 1 should be graded as a zone 1 tear.
      • Zone 1 tears are tears with a rim of less than 3 mm
      • Zone 2 tears have a rim width of 3 to <5 mm
      • Zone 3 tears have a rim width of 5 mm or >

3. Radial Location –
   a. Indicate whether the tear is posterior, mid body or anterior in location. Tears should be graded according to all the zones in which they are located. For example, a complete bucket handle medial meniscus tear would be in the posterior, mid body and anterior zones.

4. A tear of the lateral meniscus that extends partially or completely in front of the popliteal hiatus should be graded as central to the popliteal hiatus.

5. Tear pattern—the tear should be graded according to the patterns that are demonstrated in the drawing. Tears should be graded on the predominant tear pattern. Complex tears include 2 or more tear patterns.

6. Quality of the tissue—degenerative characteristics include cavitations, multiple tear patterns, softened meniscal tissue, fibrillation or other degenerative changes.

7. Length of tear—should be measured from the arthroscopic ruler in millimeters. The length of a radial tear is the distance the tear extends into the meniscus.

8. Please indicate the amount of meniscal tissue that has been excised by drawing on the diagram and crosshatching the part of the meniscus that was removed.

9. Indicate the percentage of meniscus (surface area) that was excised.
1. TEAR DEPTH
   - Partial
   - Complete

2. LOCATION (refer to diagram for description)
   Rim Width (circumferential location):
   - Zone 1
   - Zone 2
   - Zone 3

3. RADIAL LOCATION
   Posterior – Mid body – Anterior Location:
   - Posterior
   - Mid Body
   - Anterior

4. CENTRAL TO THE POPLITEAL HIATUS
   - Yes
   - No

5. TEAR PATTERN (refer to diagram for description)
   - Longitudinal-vertical: extension is a bucket handle tear
   - Horizontal
   - Radial
   - Vertical flap
   - Horizontal flap
   - Complex

6. QUALITY OF TISSUE
   - Non-degenerative
   - Degenerative
   - Undetermined

7. LENGTH OF TEAR IN MM
   -

8. INDICATE THE AMOUNT OF
   meniscus that was excised by drawing on the
diagram and crosshatching the part that was
removed.

9. WHAT PERCENT OF THE MEDIAL MENISCUS WAS EXCISED?
   -
   - %