

## Appendix II – Measurement Descriptions

### Mid-Patellar Circumferential Measurement

#### Procedure:

- Position patient in supine with hip in neutral and knee extended and relaxed as much as possible<sup>1</sup>
- Palpate and mark the superior and inferior borders of the patella<sup>2</sup>
- Perform three trials of circumferential measurement to the nearest 0.1 cm using a flexible measuring tape halfway between the markings<sup>2,3</sup>
- Calculate the mean of the three circumferential measurement trials<sup>3</sup>
- Repeat procedure on the uninjured side and record the mean circumference difference

#### Interpretation

- Increased circumferential difference between the injured and uninjured limb indicates increased knee effusion<sup>2</sup>

### Bulge/Stroke Test

#### Procedure:<sup>4</sup>

- Stroke upward with the edge of one hand in a distal to proximal direction along the medial aspect of the knee joint
- Stroke downward with the edge of one hand in a proximal to distal direction along the lateral aspect of the knee joint

#### Interpretation:<sup>4</sup>

### Bulge/Stroke Test Grading Scale<sup>5</sup>

Grade	Test Observation
0	No wave seen with downstroke on lateral knee
Trace	Small wave seen at medial knee with downstroke on lateral knee
1+	Large bulge seen at medial knee with downstroke on lateral knee
2+	Large bulge returns to medial knee without downstroke to lateral knee required
3+	Unable to move effusion out of medial knee with upstroke on medial knee

### Ballotement/Patellar Tap Test

**Procedure:**<sup>6</sup>

- The examiner performs several downward strokes from anterior thigh towards the superior patella
- The examiner grasps the thigh just proximal to the knee with one hand and applies anterior to posterior pressure to the patella with the other hand

**Interpretation:**<sup>6</sup>

- The test is positive for significant joint effusion if the patella floats or if the patella bounces back anteriorly

**IKDC Subjective Knee Evaluation Form Swelling Component (Item 5)**<sup>7,8</sup>

What is the highest level of activity you can perform without significant swelling in your knee?

- A. Very strenuous activities like jumping or pivoting as in basketball or soccer (1)
- B. Strenuous activities like heavy physical work, skiing or tennis (2)
- C. Moderate activities like moderate physical work, running or jogging (3)
- D. Light activities like walking, housework or yard work (4)

**Lysholm Knee Score Swelling Sub-Section(0-10)**<sup>9</sup>

- 0 – Moderate to great effusion
- 5 – Little Effusion
- 10 – No Effusion

**Modified Noyes Form – Swelling Sub-Section (0-10)**<sup>10</sup>

- 0 - I have severe swelling with simple walking activities. The swelling is not relieved by rest
- 2 - My knee swells after simple walking activities and light work. The swelling is relieved by rest.
- 4 - Swelling limits my participation in sports and moderate work. Occurs infrequently with simple walking or light work. Occasionally with simple walking or light work-about three times a year.
- 6 - There is occasional swelling with light recreational activities or moderate work.
- 8 - I have occasional swelling in my knee with strenuous sports or heavy work.
- 10 - I experience no swelling in my knees.

**Un-named Standardized Knee Effusion Scale (1-4)**<sup>11</sup>

- 1 – No Swelling
- 4 – Severe Swelling

**Knee Volumeter Measurement of Effusion**<sup>12</sup>

- Knee volume measured by water displacement using specially designed knee volumeter
- Side to side differences were compared in milliliters

## References

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