Is Meniscectomy such a bad thing compared to meniscal repair?

Jack M. Bert, MD
Adjunct Clinical Professor
University of Minnesota
Minnesota Bone & Joint Specialists, Ltd
St. Paul, Minnesota
Disclosures

**Consultant:**
- Smith & Nephew
- Exactech
- Wright Medical Technology
- Arthrex
- Sanofi
- LINK
- Exscribe

**Associations & Editorial Boards:**
- Editorial Board, Orthopedics Today
- BOD Retired NFL Player’s Association
- Executive Advisor, AANA
2005-2011

- The database (Pearldriver patient record database) represented approximately 9% of the US population under 65 years of age.
- 387,833 menisectomies, 23,640 repairs
- Repairs represented (6.1%) of all meniscal surg.
- Significant increase in the total number of isolated meniscus repairs performed (P = .001) and doubling of the incidence of repairs from 2005 to 2011.
Conclusions

- Trend is an increased number of isolated meniscus repairs being performed in the US over the past 7 years without an increase in meniscectomies over the same time frame.

Abrams et al, AJSM, 10/2013
20 years ago...

- Laboratory investigations:
- **Shock absorption**
- **Lubrication**
- **Stabilization** of the knee joint
- Menisci **distribute load** over the tibial plateau facilitated by the circumferential collagen fibers in the peripheral third of the meniscus
20 years ago...

- Biologic studies demonstrate that **meniscal healing can occur through neovascularization** in the vascular periphery.
- Authors recommended techniques “to preserve the menisci were both possible and mandatory”.
- As evidence has accumulated from both animal and clinical studies of the frequent development of **degenerative changes following meniscectomy**, surgeons have become increasingly aggressive in their efforts to conserve as much meniscal tissue as possible.

Newman et al, Arthroscopy, 1993
Historically

- Kettelkamp DB, Jacobs AW. Tibiofemoral contact area--determination and implications. JBJS 1972
So, if the meniscus is so critical to the joint, when is meniscectomy an appropriate procedure?
Should we be doing meniscectomy in older patients?..recent article with media attention: 12/26/13

Arthroscopic Partial Meniscectomy versus Sham Surgery for a Degenerative Meniscal Tear

Raine Sihvonen, M.D., Mika Paavola, M.D., Ph.D., Antti Malmivaara, M.D., Ph.D., Ari Itälä, M.D., Ph.D., Antti Joukainen, M.D., Ph.D., Heikki Nurmi, M.D., Juha Kalske, M.D., and Teppo L.N. Järvinen, M.D., Ph.D., for the Finnish Degenerative Meniscal Lesion Study (FIDELITY) Group

ABSTRACT

BACKGROUND

Arthroscopic partial meniscectomy is one of the most common orthopedic procedures, yet rigorous evidence of its efficacy is lacking.
Media Exposure

- Wall Street Journal: 12/26…“Sham procedure is as effective as real procedure for pain”
- New York Times: 12/26…“At 1 yr. most patients in both groups said knees feel better and would choose same method even if fake”
- CBS News: 12/27: “Scores between 2 treatment groups about the same”
- CNN: 12/26: “Surgery provides little or no benefit in older patients”
Premise

• "Accordingly, we selected patients who would be expected to benefit from arthroscopic partial meniscectomy — those with a degenerative tear of the medial meniscus\textsuperscript{19} and no osteoarthritis"\textsuperscript{24,25}

• This patient group should be “expected to benefit from partial meniscectomy”

Sihvonen et al, NEJM, 12/26/13
What are the outcomes of meniscectomy vs. meniscal repair? (Systematic Review)

- Partial meniscectomy, short term & long term had lower reoperation rate (1.4% & 3.9% resp.) compared to meniscal repair (16.5% & 20.7%)

Paxton, Arthroscopy, 2011
However, large series of meniscectomy S/P meniscal repair in NY......

- **9,609** meniscal repairs, 2003-2010
- Frequency of subsequent meniscectomies **8.9%** with F/U of 3.0 years (SPARCS database)
- Other recent studies higher rate S/P repair **(18%)**

Lyman et al, AJSM, 2013
Wasserstein et al, AJSM, 2013
Meniscectomy vs. meniscal repair

- Long term clinical outcome scores confirmed that meniscal repair was associated with higher Lysholm scores and less radiologic degeneration than partial meniscectomy

- **THEREFORE: Even though meniscal repairs have a higher reoperation rate than partial meniscectomies they have a better long term outcome**

  Paxton et al, Arthroscopy, 2011
OA occurs after only moderate meniscal resection...

- 8.8 yr. F/U in 81 patients: 42 repair, 39 menisc.
  in young athletic population

- **19.2% S/P repair, had OA**

- **60% S/P meniscectomy had OA**

↑ level of sports activity after repair

Stein et al, AJSM, 2010
OA development depends upon the amount of meniscal resection S/P meniscal repair

- 295 cases with unstable peripheral vertical tears
- Time from injury to meniscal repair correlated with ↑ volume of meniscus removal
- Amt. of meniscectomy (volume of meniscus) is rarely ↑ when compared with initial lesion
- If the meniscus can be partially saved, a risk of partial failure should be taken whenever possible!

Pujol, AJSM, 1/2014
Pujol et al, AJSM, 2011
Contact pressure ↑ S/P resection as does OA!

- Meniscectomy results in **progressive articular cartilage degeneration** due to ↑ **peak contact pressures of up to 235% proportionally 2° to extent of meniscus removal**

- OA is noted on MRI even after partial meniscectomy!!

Allen, JBJS, 1984  
Cox, Clin Orthop, 1975  
Fairbank, JBJS, 1948  
Helfet, JBJS, 1959  
Burke, Trans Ortho, 1978  
Baratz, Fu, AJSM, 1986  
King, JBJS, 1995  
Sommerlath, Clin Orthop, 1992  
Roos et al, Osteo Cart, 2001  
Scheller, Arthroscopy, 2001  
Cicuttini, J Rheum, 2002  
McDermott, JBJS, 2006
Tear location is critical!!

- Some **partials may represent total menisectomies** due to tear location with subsequent resection due to hoop strain inhibition in its periphery.

- A **horizontal or vertical tear** may result in pain leading to mechanical instability but will **NOT** disrupt the **functional continuity of the circumferential fibers**, **thus load bearing fxn. should be preserved!**

  Hoser, JBJS, 2001
  Jones, Clin Biomech, 1996
  McDermott, JBJS, 2006
Meniscal Repair: Red White Zone

- Meta-analysis; **review of 23 articles**
- 1,326 meniscus repairs
- 767 in R/W zone, mean age 25 yrs., mean F/U was 4 yrs.
- 83% of the repairs were considered clinically healed because no additional surgery was required

Barber & Noyes, Arthroscopy, 2014
Repair results 1° in red/white

- 14 cases lat.; red-white, 3 yr. F/U, 93% healed
- 48 cases med.; red-white, 3 yr F/U, 71% healed
- 33 cases; red-white, 17 yr. F/U, 62% healed
- 43 cases; white-white buckets, 4.3 yr F/U, 83.7% asymptomatic

Choi et al, AJSM, 2010
Choi et al, AJSM, 2010
Noyes et al, AJSM, 2011
O.Shea & Shelbourne, AJSM, 2003
Try to avoid chondral injury! **Doing a good meniscectomy is not necessarily an easy operation!!!**

- Avoid using too large a meniscal shaver for the joint space
- Avoid damage to the articular surface with the meniscal resector tools
- *Don’t be afraid* to release a moderate amount of the MCL to avoid injuring the chondral surface.....**Grade I & II MCL tears heal just fine, articular surface injuries DO NOT!!**
Chondral Injury

42 y.o. 4 years post op apparent routine meniscectomy (moderately severe scuffing)
To avoid “scuffing” or “arthroscraping” the articular surface in a “tight” knee……..

- Use a “pie crust” technique (repetitive puncturing with a spinal needle) for partial release of the MCL, OR……..
- Use an electrocautery technique to partially release the MCL
Summary
Results of meniscectomy

- Those with <50% of meniscal rim remaining had ↑ X-ray arthrosis at 12 yrs. than those with > 50% remaining
- Repeat scope > flap tear than bucket (38 vs. 24%) Best X-ray results occurred in valgus knees
- ↑ Outerbridge scores at time of surgery was correlated with ↓ results at 12 years SO AVOID INJURING THE ARTICULAR SURFACE!!!

Fabricant & Jokl, JAAOS, 2007  
Rangger, AJSM, 1995  
Burks, Arthroscopy, 1997  
Yocum, JBJS, 1979  
Allen JBJS, 1984  
Joregensenm JBJS, 1987
Ideally, it’s fair to say that the arthroscopic knee surgeon should maintain as much healthy stable meniscal tissue as possible that will not result in a retear in the future!
The results of repair...

- **Clearly**, after a review of the literature, the most CONSISTENT SUCCESSFUL results of repair in multiple series by multiple surgeons are peripheral longitudinal tears in stable knees in the red-red or red-white zones with < 4mm. of meniscal rim remaining.

Veltrin, Arthroscopy, 1993
Gillquist, Arthroscopy, 1993
Tenutal, AJSM, 1994
Barber, Arthroscopy, 2013
The “Take Home Message” is that we should resect…

- Oblique and flap tears in the white zone except *PERHAPS* in the very young
- Some buckets with degenerative, unstable remnant
- The unstable portion of horizontal cleavage tears back to a stable remnant
- A radial tear (attempt to save as much as possible)
- Displaced, symptomatic, degenerative tears
- Complex tears back to a stable remnant
- White on white tears in unless patient willing to accept a relatively high risk of failure
Thank you