Practical Arthroscopy Newsletter Vol 12 No 6 2007

Editorial

The teaching of surgical motor skills.

Our current method of teaching arthroscopy motor skills involves a gradual progression of skills. Initially the basic concept of triangulation is taught on knee and shoulder plastic models. Most of the steps of the common procedures, such as ACL reconstruction, and rotator cuff repairs, can then be taught on the Donnie Knee and Alex sawbones plastic models.

The next step is instruction and practice on cadaver shoulder and knee specimens. Almost all the knee procedures can be learned on the cadaver.

The final step is to teach the individual steps of the procedure during live surgery. It is unlikely that even the fellow will do the entire case from start to finish, but they master the individual steps such as graft harvest, notchplasty, tunnel drilling, and graft fixation. By the end of their training they will be able to put all the steps together.

In this current environment of concerns with patient safety, and economic pressures of completing the live surgery in a prescribed period of time, we need to look to other methods of teaching the motor skills.

Computer simulation has been touted as the ultimate answer for years, but so far the devices are still primitive, and do not even come close to the cadaver method of instruction. At best the programs allow you to chase a ball around the shoulder or play a variation of a flash internet based computer game.

There are some people who are just not suited to arthroscopic surgery. There has never been any motor skill test to select candidates for arthroscopic training. Even dentists have a motor skill test prior to entering dental school. I once had a fellow who after 3 months could usually visualize the medial compartment, but rarely could get into the

lateral compartment. We called it quits after the 3 months, and I advised him to do medical administration, which he did. I should have picked up on his lack of motor skills when I took him water skiing, and he kept falling, eventually loosing his Rolex watch! Now that is a motor moron!

Another important, but neglected concern, is how do we objectively evaluate our residents and fellow's skills. We currently very subjective determine by observing them and timing their performance of the steps of the operation.

Teaching of Arthroscopic Skills: What role does the computer play?

It has long been an ideal that we could teach the basic skills with a computer program. Pilots have long been trained, tested, and evaluated on a flight simulator. The current arthroscopy simulator developed with the AAOS, and supported by grants from AANA, tests only triangulation, and ease of moving instruments around the knee.

It has been reported that students with video game experience performed laproscopic surgery better. To the best of my knowledge there has been no similar study comparing arthroscopic skills.

Dr. Steve Snyder has used his Sammy the Simulator to get some idea of the skill levels of potential fellowship candidates. One of his fellows said that he was looked on more favorably due to his good score on the simulator.

Recently I heard a paper from the UK at the residents and fellows arthroscopy meeting on the use of a computer based training tool, and its relationship to the surgical motor skills. Dr. Rowena Umaar presented the research on the validation of an Internet based pre-conditioner training tool for shoulder arthroscopy. The skill demonstrated with the computer games were well correlated with the motor skills demonstrated on the Alex shoulder model. But, does this mean that more practice with the computer games will improve the surgical skills, or is this just a screening test to identify the potential candidate that has the necessary skill set to perform arthroscopy?

The Internet based game can be found at www.shoulderdoc.co.uk Go and practice your skills.

The paper referenced above is also found on the web site:

Arthroscopy Skills Tests

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Background:
The increased number of arthroscopies has led to a greater number of formal methods of teaching and assessment. The skills required for arthroscopy differ to that for open surgery. It is recognized that not everyone has the specific abilities to perform arthroscopic surgery and perhaps some medical students have the ability to develop arthroscopic skills more easily than others.

Aim:
To assess whether performance on 5 specially designed Macromedia MX Flash programs correlated with 3 arthroscopic tasks performed on a synthetic should model, and whether any particular activities or demographics may involve any preconditioning skills for arthroscopy.

Methods:
32 medical students were asked to complete a questionnaire, list their hobbies, perform 3 arthroscopic tasks (navigation, triangulation, instrumentation) on a shoulder model, and perform 5 Flash tests on a laptop. They were grouped by their sex, hand dominance, and if they participated in any of the 9 activity categories.

Results:
Navigation score correlated significantly with 4 Flash tests' scores. Instrumentation score only significantly correlated with 1 Flash test score. Non string instrument players performed significantly better than string instrument players ($p=0.033$) at instrumentation. Other groups (computer gamers, crafters, drummers, right handers) performed faster than their corresponding groups in all skills, but not significantly.

Conclusions:
It appears that there is a role of Flash tests in predicting an individual's ability to perform arthroscopic navigation and instrumentation. It would appear that certain hobbies and

demographics may have a role in predetermining the skills required for shoulder arthroscopic surgery. Further investigation with larger groups and additional assessment tools is underway.

In a recent article in AJSM by Warner et al, they studied the correlation of the performance on a surgical simulator with surgical experience. The more experienced surgeons scored better on the computer simulator. It is interesting that there was no correlation with video game experience. These results suggest that some training on a simulator would improve the surgical skills. However, it goes without saying that the individual must have the basic talent to perform these motor skills. How do we screen for these individuals before we accept them in our training programs?

Complications in ACL Reconstruction

Divergent Screws

The cannulated screw has helped reduce the problem of divergent screws.

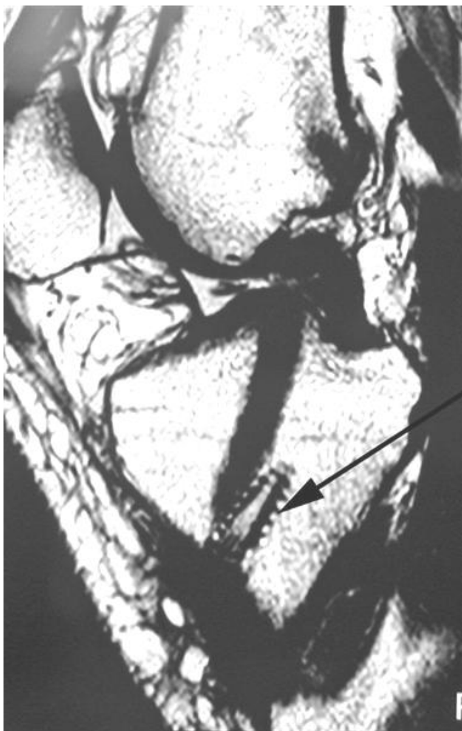


Fig 1. The tibial screw is divergent in the tunnel, providing less fixation strength.

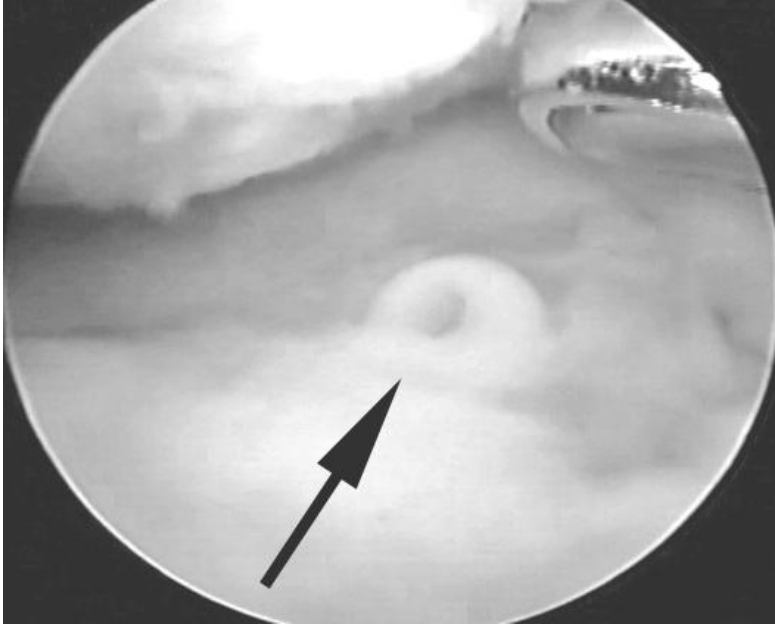


Fig 2. The Intrafix device did not follow the tibial tunnel.

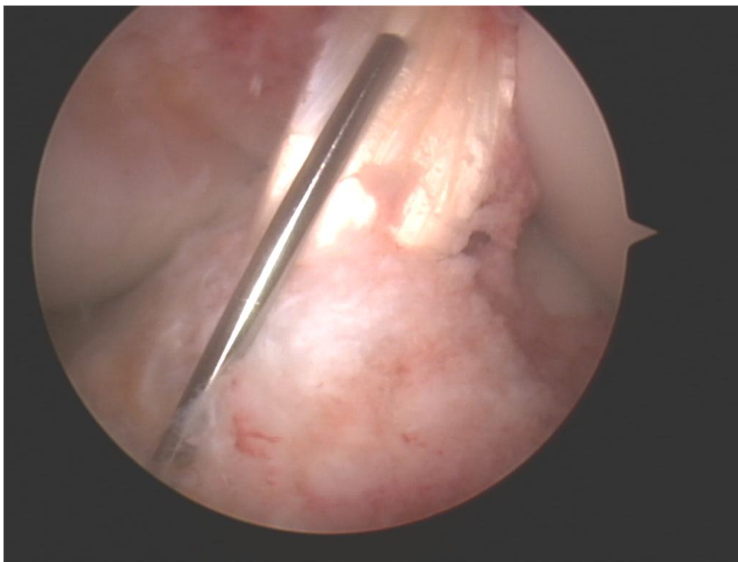


Fig 3. The XtrLok tibial screw did not follow the tunnel and came out anterior to the graft tunnel. We did not get a photo of the screw in this new tunnel, but the guide wire shows that the new tunnel was anterior.

I recently had a complication of a divergent screw in the tibial tunnel. And this is after I thought that I had seen all the complications known to man!

The bioscrew Nitinol guide wire was placed up the tibial tunnel. The screw was advanced about half way up the wire, and the wire was removed.

This is the usual procedure to keep the guide wire from bending and preventing the screw from advancing. We did have a complication where the guide wire broke, and was pushed into the back of the joint. This took some time to retrieve it though a posterolateral portal. Someone passed on a similar complication story to me at ISAKOS this year. In his case the guide wire broke off, was pushed into the back of the joint, but was not recognized until the patient complained of pain, and catching. The plain x-ray revealed the errant bit of wire that was quickly removed with a repeat arthroscopy.
The message is that it is easy to drop your hand and either bend the guide wire, or if the wire has been removed to push the screw into the soft cancellous bone. This is one more reason to inspect the joint after the graft has been fixed.

Medial Collateral Ligament Repair

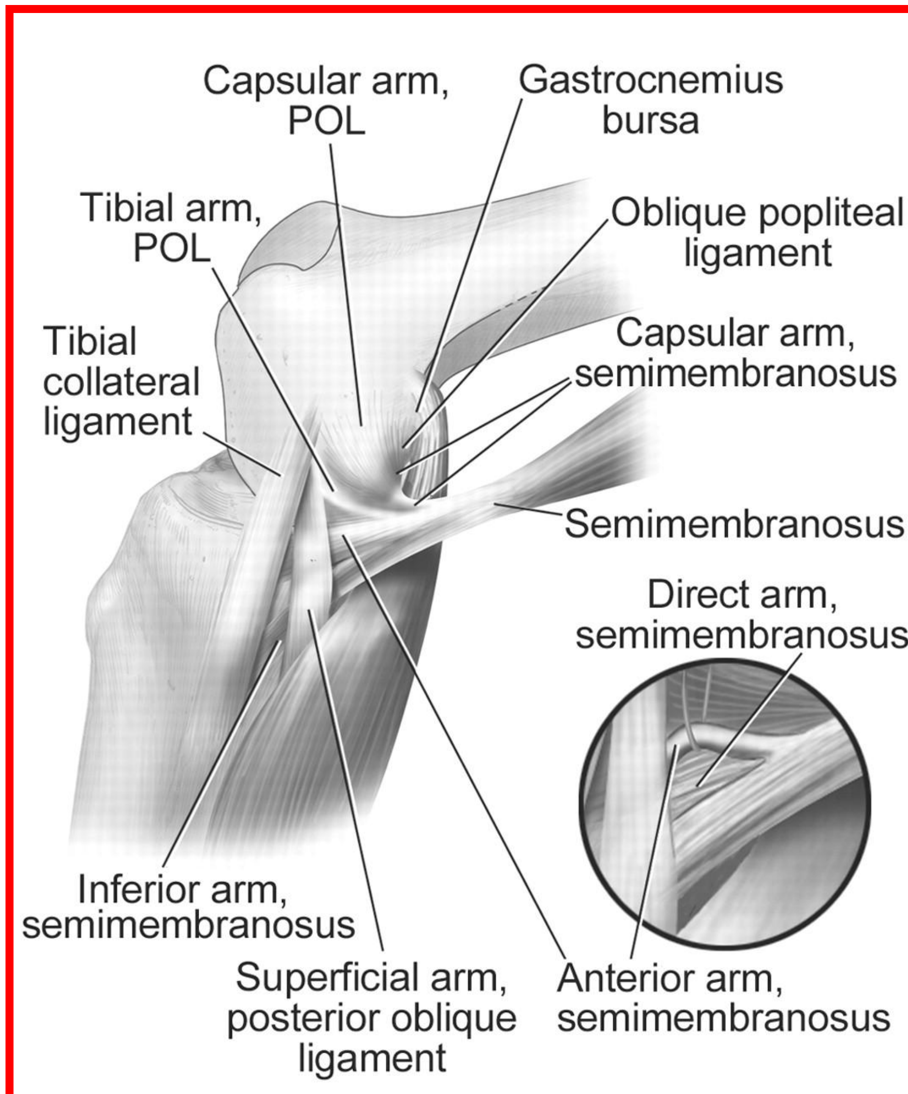


Fig 4. A diagram of the posteromedial anatomy of the knee.

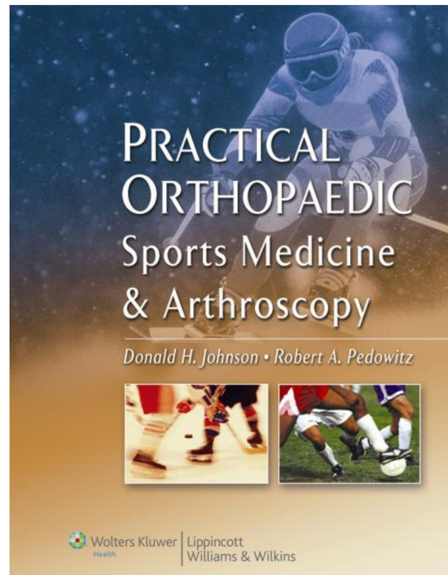
We have come a full circle from the days where we repaired all the MCL tears, to a point where we neglected most of the tears, because we were told that the MCL can heal. Now we recognize that some of the grade 3 tears with disruption of the posterior oblique ligament and capsule in fact do not heal well and leave residual instability. The trick is how to recognize the ones that need repair? The clinical examination will demonstrate increased rotation of the tibia, either anteromedial or posteromedial. The MRI may also show disruption of these posteromedial structures. The torn tissue can be repaired back to the bone with suture anchors. It is ideal to do the repair acutely within 10 days so that the anatomy can be identified.

The controversy is with the combined MCL/ACL injury. Do you repair both the ligaments early, immobilize to allow the MCL to heal, and do a late ACL reconstruction, or repair both after ROM has been obtained.

There was a recent paper published in the American Journal of Sports Medicine No 34 2006 by Halinen et al that compared the operative versus non-operative treatment of the MCL injury in conjunction with ACL reconstruction. This was a randomized clinical trial that compared whether or not the grade 3 MCL injury was operated on at the time of the ACL reconstruction. The ACL was reconstructed with a BTB graft. The knees were protected with a hinged brace, but otherwise early weight bearing and motion was encouraged. The 2 year outcome showed no measureable difference in the 2 groups, especially no significant loss of range of motion, even with early repair of the MCL and reconstruction of the ACL with a BTB graft. Perhaps they did not see the late laxity of the posteromedial corner due to the early ACL reconstruction, and brace protection. We have been cautious to reconstruct both ligaments early due to the potential for stiffness, but this study showed that loss of motion was not a problem. It seems that if the results of both operative and non-operative treatment of the MCL are the same, it might be more prudent to treat the MCL non-operatively. Obviously, at the present time there is no one best case scenario for everyone, and you will have to use your clinical judgment for each individual case.

Practical Orthopaedic Sports Medicine and Arthroscopy

Donald H Johnson and Rob A Pedowitz PhD



Written by noted experts in orthopaedic sports medicine, this book is a comprehensive, practical guide to diagnosis and treatment of sports-related injuries. It covers all the material required for the American Board of Orthopaedic Surgery's new Subspecialty Certificate in Sports Medicine examination. Emphasis is on detailed, step-by-step descriptions of surgical techniques for treating sports-related injuries, including the latest arthroscopic procedures. These techniques are illustrated with over 800 full-color original drawings and photographs. The authors describe their preferred methods for treating each injury. Bulleted key points appear at the beginning of each chapter.

Available at: http://www.lww.com/product/?978-0-7817-5812-3

Upcoming Meetings

- American Orthopaedic Society of Sports Medicine Annual Meeting
    - July 12-15, 2007 Calgary Alberta Canada
    - Contact www.aossm.org
- Deadline for submissions to the AANA annual meeting 7 Sept 2007
- Florida West Arthroscopy Association
    - Annual Meeting Siesta Key Oct 28-29, 2007
    - Contact Donnie@carletonsportsmed.com
- AANA fall course

- Marriott Grand Lakes Orlando FL. Nov 1-3, 2007
- Contact AANA www.aana.org