

Evidence-based medicine and ACL reconstructions

By Dr J

I was lucky enough to have an extended overseas trip over summer during which I attended my first North American conference in more than five years. I'm very privileged to look after the NSW State of Origin rugby league team currently, but it means that I miss the ACSM annual conference, and I really do miss it, if you know what I mean. Last year I missed the Roald Bahr Oslo extravaganza on injury prevention, again with a fair tinge of regret. So it was great to have a week of skiing this January in Colorado (at a conference organised by Ohio State University (OSU)¹) and get reminded how impressively the Yanks deliver their material at a conference presentation.

One of the highlight presentations was Kurt Spindler, an orthopaedic surgeon from Vanderbilt University, on "evidence-based medicine". This is a trendy topic and it was great to see a surgeon be such a disciple of this movement (given that surgeons are renowned for preferring clinical experience to scientific proof). I got the impression that Spindler really wouldn't ever do a knee arthroscopy on a degenerative knee without a meniscal tear, because the best available evidence suggests it wouldn't help the patient.

Of course, we all know that, in the real world, despite knowing that the evidence doesn't support the procedure, many orthopaedic surgeons will convince themselves -- and more importantly the patient with knee pain from a degenerative knee sitting in the waiting room -- that an arthroscopy is worth doing. "In my experience, there have been patients with knees just like yours who an arthroscopy has helped", is how the

sell runs. Of course there have been plenty who have got worse (which most surgeons now reveal as part of their informed consent) but, hey, if that happens we can always fix you up properly with a knee replacement!

There was another good presentation at the OSU conference by Chris Kaeding on stress fracture management, where he pointed out, correctly, that many stress fractures are quite rare and that we therefore do not have any level I evidence (randomised control trials) on which to base our management; therefore the level IV case series and level V experiences are still important.

After Spindler's presentations I was even more convinced that, when you have good quality level I evidence, you need to make alterations to your clinical practice to follow this evidence. However, there is still a lot of debate over what is needed to satisfy the criterion of good quality level I evidence, and I'm not so sure that a bad quality level III study is more important than a good dose of level V experience.

In Spindler's presentation he gave a few analogies: eg, "We can classify wine by quality, so why can't we do the same thing for scientific evidence?", he asked. A problem with this analogy, for me, was that he had a photo of a cheap Marlborough Sauvignon Blanc as an example of a level V wine and personally I probably would have enjoyed this drop more than every other white wine he used in the analogy, apart perhaps from the Premier Cru Burgundy that was his level I white example.

Spindler discussed evidence-based ACL management in both his

presentation and privately over dinner with me, and the take home messages were that (1) for young active patients there is increasing evidence that early ACL reconstruction is worth doing to prevent later meniscal damage and (2) in summary, there are minimal differences in outcome between patellar tendon and hamstring tendon reconstructions. Spindler has written up a meta-analysis of RCTs between patella tendon or bone-patella tendon-bone (BTB) ACL reconstruction compared to multi-strand hamstring tendon (HS) reconstruction (published recently in the *AJSM*) and concludes that the results of the vast majority of trials show equivalent outcomes.

I read recently that the HS ACL reconstruction should now join the BTB one as a "double gold standard" by which to judge reconstruction results, and I think that this is a fair call. I wouldn't raise my eyebrows if I heard that a friend was getting either of these operations, in the same way that I might if I heard that a synthetic graft was being used. Spindler therefore concludes that surgeons should generally go with whichever of the two techniques they are most comfortable with (in terms of ease of procedure, training etc). I think this is a fair conclusion based on the best available level I evidence, and I don't think it is bad advice.

Moving on from Spindler's conclusions, I hope you want to know how I advise my own patients in the real world and on what basis I do this. Continuing along the road of the level I studies, if you read through the fine print, there are differences in outcomes between BTB and HS procedures, even though the final scores don't significantly differ. Beyond any shadow of doubt,

there is a pretty much universal trend for BTB reconstructions to lead to slightly superior stability ratings (eg, lower side to side differences on the Lachman test) but for HS reconstructions to lead to slightly superior morbidity ratings (eg, less kneeling pain, fewer extension deficits). Spindler's message is that, because these two factors just about cancel each other out in the overall scores, there is no evidence-based reason to prefer one type of reconstruction to another, just as there is no reason to prefer sauvignon blanc to chardonnay.

I'd like now to switch tack and make a level V comparison between the reconstructions of two of Australia's most well-renowned knee surgeons, Merv Cross and Leo Pinczewski. They happen to work at the same practice, which does make comparisons a little easier (and, for that matter, their rivalry a little stronger).

I immediately need to declare a bias in that I've done a regular assist list with Merv for the last 10 years or so, and that in the past I've assisted Leo and helped him construct the database which he uses to keep track of his research patient follow-ups. And I would say to anyone, including myself in the mirror, that those who do not believe that surgical-assisting earnings can cloud the view about surgical outcomes are kidding themselves. One of Leo's favourite sayings is "nothing ruins surgical results more than good follow-up", which is another way of saying that, in clinical practice alone, a surgeon and a surgical assistant are going to see a lot more of the good results in the future than the bad results (who will tend to go elsewhere).

BTW, in the Sydney orthopaedic world both Merv and Leo have reached the iconic status of famous rock-stars like Madonna, Bono, Cher etc. who generally get referred to only by their first name. I apologise if it comes across as pandering, but comparing the reconstructions of Merv and Leo is a bit like comparing the golf games of Jack Nicklaus and Tiger Woods. These golfers have different

strengths, they don't always win, but they are the part of the cream of the crop.

In saying this, I don't want to imply (because I shouldn't) that the quality of Merv and Leo's work is a cut above the other knee surgeons in Sydney (or, gulp, Melbourne) but it is a fair call to say that their famous status probably is. Merv's fame in knees has arisen through being one of the first orthopods in Australia to subspecialise completely to a particular joint (in the early 80s) and through his association with rugby league, which Eddie (another known by his first name) is now finding is the sport which makes Australia's biggest city tick. Leo's fame has come through becoming the highest turnover ACL reconstruction surgeon in the world (as he will no doubt tell you if you ever ask) and having the most comprehensive patient follow-up database for ACL reconstructions in the world.

Now an interesting thing between Merv and Leo is that with respect to ACL recos, Merv has the reputation as a devout patella (BTB) man and Leo has the reputation as a devout hamstring (HS) man. Merv doesn't have a problem with Leo being Jewish and Leo doesn't have a problem with Merv being Catholic; just don't get them started on ACL technique! I would contend that their "religions", as far as ACL recos go, run much deeper than simply BTB versus HS.

I would characterise Merv as a "stability" disciple and Leo as a "low morbidity" disciple. That is to say, Merv is devoted to an ACL technique across the board which maximises stability, whereas Leo is devoted to an ACL technique across the board which minimises morbidity. In addition to preferring BTB grafts, Merv likes to do acute reconstructions the week of the ACL injury, likes to put the knee in a brace for a few weeks and likes the patient to wait a bit before jumping back into active physio. Leo, on the other hand, not only prefers HS grafts, but likes to wait a few weeks before performing the reco itself (until the acute swelling has gone down). After the operation has been done though,

Leo encourages mobilisation as quickly as the patient can tolerate it.

When you combine the differences between technique and philosophy, you get knees which have subtle but consistent differences in their characteristic outcomes. The vast majority of both both Merv and Leo post-ACL reco knees are functionally stable and with their owners (ie, their patients) happy with the final outcome. However, when you examine a bundle of Merv and Leo knees they start to feel "different" as consistent patterns emerge.

Almost all of Merv's ACLs feel as "solid as a rock" with the Lachman test virtually identical to the other side. If you start getting picky with the outcomes, you also notice that a small proportion of Merv's knees don't quite have the full 180 degrees of extension. With Leo's ACLs, you feel as if virtually all of them have a great range of motion, lack of effusion and lack of quads wasting. And then if you feel a few more and start to get critical, you think that the odd knee has a Lachman test with more play than the contralateral side. Of course, even the "slightly tight" Merv knees and "slightly loose" Leo knees are generally well tolerated by the patient, which is a reason why these two surgeons are so popular for ACL reconstructions.

Remember that, with all of the above perceived differences I am documenting, the evidence as to whether they exist is level V only, because a comparative trial hasn't been done. If you doubt the above observations, though, ask any of the physios or sports physicians at North Sydney whether they strongly disagree and I'll bet you a beer that they won't.

If you are convinced that the differences between a Merv knee and a Leo knee are real and consistent, you can start to play horses for courses with the patient selection in terms of who you might recommend referring to either of them. The interesting thing is that preferred patient selection, in my opinion, pretty much matches up with how

these two surgeons built up their practices in the first place.

Merv is an ex-rugby league player, and he pretty much wants to give you the knee that will allow you to return to football (or any other sport) for the rest of your sporting career, if that's what you desire. One of Merv's favourite sayings is "treat the primary presenting complaint of the patient" which in the case of an ACL injury is usually instability. Yes, anterior knee pain does exist but, in Merv's eyes (and I'm quite sure he is correct), the number one reason for not being able to play football after an ACL reco is that your knee is still unstable. NRL players who tear their ACL are happy to use Merv for the reco, because they know of plenty of other players whom Merv has done and who got back to their former level, so they are happy to stick with someone who has runs on the board. Private patients who don't play NRL-level rugby league are also more than happy to use Merv, knowing that he has returned so many top athletes to their sport, in the thought that if he can make the operation work for a big name NRL player, then he'll get it right for them.

Leo's rationale works along slightly different lines or the premise that you should be doing anything for the patient that is likely to improve their satisfaction at follow-up. What patients want from their operation at the time of the acute injury (which is to have the knee back to how it was before) is slightly but subtly different to what they might want one or two or five years down the track. Straight after the injury, if you put it in terms of "which would you rate as the most important characteristic of the operation, one which gives you the most stable knee or one which gives you the most comfortable knee?" many football or basketball or netball players might opt for greater stability. One or two or especially five years down the track, the so-called football player might now instead be a keen golfer and, if you are a golfer, anterior knee pain is more important than stability. After being through major knee surgery, the desire to play multidirectional

sports can quickly wane. In fact, some people believe that it is our duty as clinicians to try to recommend to our non-professional athletes that they wind down their enthusiasm for multidirectional sport after suffering an ACL reconstruction, for fear of developing arthritis.

Leo has an excellent clinical database, which has led to many published papers, comparing the results of his own BTB reconstructions (which he did earlier in his career) and his more recent HS reconstructions. He strongly argues that his results suggest that HS reconstructions are preferable, because of the significantly better morbidity outcomes and because the stats don't reveal any significant differences in the stability outcomes. Bear in mind that, even with a moderately large cohort, it is easier to show statistically significant differences between groups for a characteristic that is common (eg, anterior knee pain) than a characteristic that is more rare (eg, graft rupture).

While his overall study group has longer follow-up than any other comparable one worldwide, it is also worth remembering that it is not a level I (randomised) trial. There are some potential biases that might affect the results. Is Leo a better surgeon at this stage of his career than he was earlier in his career? Is the average person getting referred to him in recent years more sedentary (less likely to want to play high demand sports) than the average person getting referred to him 10 years ago? These sorts of biases are hard to measure but definitely can affect the observed differences between groups.

Other surgeons and sports physicians reading this column would also be very aware that it isn't a comprehensive overview of all of the available procedures to reconstruct an ACL. One common denominator between the Merv and the Leo techniques is that they both use interference screw fixation for the femoral end of the graft. Other fixation devices such as Transfix screws and Endobuttons might give better results for HS reconstructions. I fail to see the logic for using these devices, as a minority of surgeons do, for fixing a BTB graft. Fixation

and stability are the big issues with respect to HS grafts whereas avoiding anterior knee pain and regaining full range of movement are the big issues with respect to BTB grafts. If you watched the Winter Olympics, you might want to consider using cadaver grafts, although don't hold your breath waiting for an RCT showing differences in transmission of hepatitis between cadaver grafts and autografts.

I'd also like to caution, even with my biased hat on, against going too far with the strong trend towards HS graft usage that has occurred in Australia over the past decade. According to Spindler's evidence-based recommendations, surgeons should just go with whichever technique they are most comfortable with. This seems to be the HS technique a substantial majority of the time in contemporary Australia.

The HS techniques (and there are a few of them) are generally slightly faster procedures which are relatively easier to perform (you are far less likely to get the graft stuck going into the tunnel if you don't have to worry about a bone block). This is in the background of ACL reconstructive surgery being one of the most difficult techniques in orthopaedics (which is a good reason for wanting a experienced surgeon). In general, HS grafts probably lead to shorter hospital stays and fewer physio visits post-op, so there are lots of practical reasons to prefer them.

However, it is sobering to recall that according to our ACL injury database in the AFL, with medium-term follow-up, 10%-15% of players will re-rupture their graft at some stage down the track. Geoff Verrall, who works in Adelaide and sees many SANFL players (which is where many ex-AFL players go to continue their careers) reckons that this figure would be even higher if we followed up players to the end of their total football career rather than just their AFL career. I would also add that there are quite a few re-ruptures in NRL players that I know of, meaning that the Sydney surgeons collectively may not be doing better than the surgeons in the southern states. If we still are

getting such a high rate of recurrent instabilities in our elite athletes, it means that as doctors we should only discard an operation which has a proven track record for stability (BTB grafts) with a lot of caution.

On that note, later in this edition of Sport Health, the Merv Cross technique for BTB grafts (and its rationale for use) is presented. It doesn't have the same database of follow ups as the Leo Pinczewski operations, so I can't unfortunately give you some crucial stats which you might like to know. Does the Merv technique lead to fewer revision reconstructions than the alternatives? Does it lead to more revision arthroscopic procedures for Cyclops lesions (extension deficits)? Read on and form your own opinions (and importantly also read the Pubmed listed Spindler, Pinczewski and Feller papers which are all essential reading on this topic). My level V experience tells me that the answer to the first question is 'Yes' and my response to the second question is often "Which would you rather?" **SH**

Further reading:

Bartlett RJ, Clatworthy MG, Nguyen TN. Graft selection in reconstruction of the anterior cruciate ligament. *J Bone Joint Surg Br* 2001 Jul;83(5):625-34.

Brukner PD, Crossley KM, Morris H, Bartold SJ, Elliott B. 5. Recent advances in sports medicine. *Med J Aust* 2006 Feb 20;184(4):188-93.

Orchard J, Seward H, McGivern J, Hood S. Intrinsic and extrinsic risk factors for anterior cruciate ligament injury in Australian footballers. *Am J Sports Med* 2001 Mar-Apr;29(2):196-200.

Roe J, Pinczewski LA, Russell VJ, Salmon LJ, Kawamata T, Chew M. A 7-year follow-up of patellar tendon and hamstring tendon grafts for arthroscopic anterior cruciate ligament reconstruction: differences and similarities. *Am J Sports Med* 2005 Sep;33(9):1337-45.

Spindler KP, Kuhn JE, Freedman KB, Matthews CE, Dittus RS, Harrell FE Jr. Anterior cruciate ligament reconstruction autograft choice: bone-tendon-bone versus hamstring: does it really matter? A systematic review. *Am J Sports Med* 2004 Dec;32(8):1986-95.

Webster KE, Feller JA, Hameister KA. Bone tunnel enlargement following anterior cruciate ligament reconstruction: a randomised comparison of hamstring and patellar tendon grafts with 2-year follow-up. *Knee Surg Sports Traumatol Arthrosc* 2001;9(2):86-91.

References

- 1 Anyone interested in attending a repeat OSU sports medicine/ski conference in Colorado, should they repeat the exercise next January, can express interest by emailing me at johnworward AT gmail.com (AT means @ but is not quoted directly to avoid spam from robots).

Steps in the right direction » Continued from page 2

had representation on the body that advises appropriate levels of qualification and training for fitness professionals, it is probably true to say that, for many, this representation was seen as a mechanism for ensuring that fitness professionals didn't attempt to practise outside of their areas of expertise.

Indeed, when the Discipline Groups and SMA members represented on various SMA bodies were surveyed for their response to the proposal for a closer relationship with Fitness Australia, many such concerns were raised.

Members cited issues such as:

- fitness centres are only concerned about making money – they have no real interest in the welfare of their clients;
- there is inadequate screening to identify clients who may be at risk and inadequate supervision to prevent injury;
- do fitness professionals understand and respect a hierarchy of expertise?
- fitness professionals may misrepresent themselves as having qualifications equivalent to tertiary trained health professionals; and
- does Fitness Australia recognise the expertise and qualifications of SMA members – especially exercise physiologists? This latter point has been a point of particular frustration, as regulations in some states require tertiary-trained exercise physiologists to acquire additional TAFE-level qualifications before they can be registered to practice as fitness professionals.

To what extent these concerns were real or imagined (and the last is definitely real), the National Board is of the view that SMA must work with Fitness Australia - to resolve these issues and also to work together to provide a higher level of service from both organisations.

Certainly Fitness Australia has shown every indication of supporting such

endeavours. Fitness Australia has asked SMA to nominate an SMA-appointed director to the Fitness Australia National Board to take responsibility for medical and health matters. (The SMA National Board has nominated Professor Kevin Norton to this position.) Further, Fitness Australia has indicated that it would like to work towards having the SMA Screening Guidelines adopted by all Fitness Australia members.

In the course of consulting SMA members, it became apparent that, for every member with ingrained suspicions about the fitness industry, there were many other SMA members who had established referral networks with fitness centres and fitness professionals in their local areas.

Resolution of these issues and the development of a closer relationship have much to offer both SMA and Fitness Australia. As statistics on inactivity and its consequent health problems grow more alarming, it is imperative that we take an "all hands to the pumps" approach to the problem.

At last October's National Conference, a paper delivered to the "Exercise Prescription and Delivery - Who Should Do It" symposium dramatically illustrated the importance of adding to the numbers delivering advice to a population of 20 million⁵. Adding 12,000 fitness professionals – especially if they are working in close consultation with health professionals for those in the population needing more expert guidance – is a big step in the right direction. Further, adding a potential referral base of 12,000 may also have some direct positive outcomes for SMA members. **SH**

References

1. Stephen Robbins, Executive Director, Australian Osteopathic Association. Letter to SMA CEO, 28 September 2005.
2. Susan Kingsmill, Fitness Australia's President's Report, January 2006.
3. Professor Wendy Brown, Exercise Prescription and Delivery - Who Should Do It", Symposium, Australian Conference of Science and Medicine in Sport, Melbourne, 13 October 2005.