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Current Surgical and Non-Surgical Techniques in Articular Cartilage Repair

### CARTILAGE REPAIR STRATEGIES

How far had become our ability to repair cartilage and regenerate tissue? Welcome to the Clinician's Roundtable on ReachMD. I am your Dr. Sherwin Ho, Associate Professor of Orthopedic Surgery at the University of Chicago and joining us today to discuss cartilage repair strategies is Dr. Riley J. Williams. Dr. Williams is an Associate Professor of Orthopedic Surgery at Weill Medical College of Cornell University. He is also the Director of the Institute for Cartilage Repair at the hospital for special surgery.

#### DR. SHERWIN HO:

Welcome Dr. William.

#### DR. RILEY WILLIAMS:

Thanks Sherwin. Great to be here.

#### DR. SHERWIN HO:

Dr. William I know cartilage injury and their subsequent repair is the subject that near and dear to you and something you study for a long time and published extensively about. Lets talk about some of the standard treatments for cartilage injury in the knee of our athletes.

#### DR. RILEY WILLIAMS:

Well this is point of background, because I think it is always good to sort of keep this in mind, unlike skin and unlike bone articular cartilage is the cartilage that lies at the end of bone is a pristine frictionless structure almost, which once it's injured doesn't have any capacity for repair, so people like us have to go in and manipulate the tissue or to try to modify the environment such that a healing process or repair process is started or taking another strategy we put something in there to replace that which is missing. So from ultrastructural standpoint, you are really looking at two strategies, one is the transplantation of tissues into the defect and then the other is again try to enhance a natural repair response. So as you all know, perhaps the most popular and commonly performed repair strategy is the microfracture procedure, which was again modified and widely pushed by Dr. Richard Steadman in Vail with much

clinical success. We have a registry at the hospital for special surgery where in every cartilage procedure that is done in our hospital is recorded with baseline clinical scores and then followup scores, which are performed at regular intervals 6 months and then yearly subsequently, and we published a couple of papers on this topic and so paper I basically showed that yes I did 3-year followup interval microfracture does make people feel better, but if you looked at athletes, people who were participating in either division I college, high-impact athletics, basketball, soccer and American football in particular at a 2-year interval, there was only 40% return in the sports, which really is if you are sitting and speaking with a patient and really get down to the integrity of the number is not an acceptable number for return to sport, especially when they are, you know, looking at making a live in that regard.

**DR. SHERWIN HO:**

Sure, for our audience we talked about cartilage injuries and cartilage repair strategies, we are really talking about the articular cartilage in the knee as opposed to the meniscus cartilage, which lot of our viewer sometime confuse the difference between those two, and when I give a talk, I always refer to normal articular cartilage, as the holy grail of knee surgery. The beautiful substance that quotes the ins of our bones that we have never been able to reproduce with any manmade material and is yet any surgical procedure back to what nature gave us originally and that's really what we are talking about. Restoring normal articular cartilage in a knee that's been injured.

**DR. RILEY WILLIAMS:**

That's right.

**DR. SHERWIN HO:**

So we are starting talk a little bit about this surgery and the microfracture, which for audience that not familiar with is where we surgically going and stimulate blood flow to that defect by making small little holes in the subchondral bone to access the blood cells in the bone marrow this is so called stem cells of the bone marrow, but look back of a bit. Lets talk a little bit about the non-surgical strategy that we can use to manage articular cartilage injuries. There has been a lot of stress about substances like chondroitin and glucosamine at nutritional supplement. There has been a lot of talk about injections of hyaluronic acid and I think it get a little confusing for the athlete and certainly the team physician out there who is not an orthopedic surgeon. What's your strategy shorter surgery for these cartilage injuries or even following surgery were you trying to get the cartilage to heal to its best potential?

**DR. RILEY WILLIAMS:**

I have to say that managing these injuries in season versus out of season clearly lot of athletes tolerate these lesions and like everybody cannot understand this because you know someone presents with an MRI with small hole in articular cartilage we certainly don't rush them of to surgery. Physical therapy keeping the lower extremity strong and mobile it's probably the best strategy one can employ and much like meniscus tears in some patients. These symptoms associated with these types of lesion can be bleeding, so patient is probably my best first option in the circumstances. Because again, as you intimated earlier, our surgical options are really not that great, so we are trying to use anything we can; antiinflammatory medications to control swellings, effusions, and pain. The oral supplements such as glucosamine and chondroitin sulfate have been shown really to be largely placebo in randomize trial that have come out of Europe, although they are not in US currently, but again there is a very little downside to using them outside of the expense. So again when we are talking about our athletes it's a team to expense, so we do use them on occasion. But there is largely just to try that to do what we can again tourniquet and syncope guide in terms of trying to make feel better.

**DR. SHERWIN HO:**

Anything that keeps them playing I think is worthwhile as long as it is not overly expensive and not dangerous.

**DR. RILEY WILLIAMS:**

That's right. And largely again just to review our etiology you know chondroitin sulfate and glucosamine are cartilage building block material so again there is a very little downside to their use.

**DR. SHERWIN HO:**

Do you often time use cortical steroid injection in season?

**DR. RILEY WILLIAMS:**

I try not to, if there is component of synovitis that we have seen on MRI or inflammation of joint capsule, yes. Acute effusions associated with these lesions, I have not typically used corticoid steroid. This worry about their affect on the articular cartilage homoeostasis in an athlete is going to go then ran around on this thing. Again never been shown to be a problem, but as I understand cartilage biology, I am just a little nervous about it, that's all.

**DR. SHERWIN HO:**

Sure I think we all have the same reluctance to go about injecting all over athlete except in causal situation. What about the other injectables, have you had any success with the nonsteroidal injectable such as hyaluronic acid?

**DR. RILEY WILLIAMS:**

I just having had a whole lot of players in whom I thought it was appropriate even in the older players at the roomiest to suggest that they have early arthritic knees, as you know, that's who ideally the visco-supplements were designed to treat. So again haven't had a whole lot of success in my regular patient population such I really have not found a big role for them in my elite soccer players.

**DR. SHERWIN HO:**

If you are just tuning in you are listening to Clinician's Roundtable on ReachMD, the Channel for Medical Professionals, I am your host Dr. Sherwin Ho and joining me today to discuss cartilage repair strategies is Dr. Riley Williams, associated professor of Orthopedic Surgery at Weill Medical College and director of the Institute for Cartilage Repair at the hospital for special surgery in New York City.

Dr. Williams we have been discussing treatment strategies for cartilage injuries and we talked a little bit about some of more common surgeries what is some of the new things on the horizon that you been either studying or experimenting with the hospital for special surgery with regards to these cartilage injuries in elite athletes.

**DR. RILEY WILLIAMS:**

You know it is rather exciting time to be in this sort of subspecialty. Really interest in this area I would suggest you could certainly correct me on this is when Lars Peterson article on use of autologous chondrocyte or cartilage cells as a means of cartilage repair was published in New England Journal, I believe in 1994, and that really led to our clinician's focusing on these issue only because it seem that we finally have a pathway to perhaps create more Hyaline like articular cartilage like repair tissue in these areas of cartilage deficiency. And while perhaps the ACI procedure, aren't we have or haven't worked out, it did lead to focus on this question by industry, so here in 2008, we have several new types of strategies and clinical trials in US, some of which are involved with some which that are in phase II and III trail that may prove to be more effective than what we traditionally had at our disposal.

**DR. SHERWIN HO:**

Lars Peterson in the advent of ACI surgery held at the golden age of cartilage surgery for most of us and really re-energized our efforts and researching. For those of our audience who are not familiar with Dr. Williams work, Riley is really a thought leader in this area and has been for a number of years has provided us with invaluable data in leading us to perhaps better or more promising procedures for cartilage repair. So lets talks about some of the area that you have been looking at beyond what we talked a little bit of microfracture and the ACI surgery, which I also have moved away from. What's your procedure that you are currently looking at your study?

**DR. RILEY WILLIAMS:**

Well it almost so like you know going back to the feature so perhaps the oldest cartilage repair strategy that we have had has been the allograft or cartilage transplant, which in its both macro turns get involve transplanting a whole half of the knee which has had largely been considered a salvage procedure, but in its current intervention, it really represents ammonification of procedure, which had been described as the OAT procedure or osteoarticular transplant procedure, and really without getting too technical I think the hair transplant model basically taking for a self or autograft OAT a small little cylinder of cartilage again from one area of the knee and moving into defect. I mean I do that procedure, I think there is a role for it. I never like injuring the other areas of the knee. I felt like you are perhaps creating a poor environment for healing by causing more injury, and really with that type of procedure, you realize, Oh, well, you know, if you can take dowels or the cylinders from within the knee, we still can take them from donor knee. So the osteochondral allograft, the way its done currently, is largely just taking a single plug from a donor knee and transplanting that whole mature peace into an injured portion of a host knee and that is one stage procedure either can be down with a fairly minimal open type of approach not particularly morbid to the patient and now you eliminated the donor or donor site morbidity or donor site problems that are characteristic of the autograft approach or at the same time you have this whole mature implant in the host knee and the interesting thing is these transplants are viable alive and prior to 1998 we didn't have that as an option. If you are going to have an allograft done, you had to be either in Canada in Toronto or in the University of California of San-Diego, at least within driving distance. So really with the availability of those graft in 1998, it really gave a wider group of surgeons access to these types of graft and you know since 1998 and every time I doweled another types of repairs, I always kind of came back to their because it was sort of old reliable. So when I am looking at now is really on its track, how athletic patients are after this procedure, and I have to say the results have been pretty promising.

**DR. SHERWIN HO:**

Everything old is new again?

**DR. RILEY WILLIAMS:**

That's right.

**DR. SHERWIN HO:**

I would like to thank my guest, Dr. Riley Williams. We have been discussing Cartilage Repair Strategy. You have been listening to the Clinician's Roundtable, The Channel For Medical Professionals. For complete program guide and podcast, visit [www.reachmd.com](http://www.reachmd.com). Thank you for listening.