ACL Reconstruction for a football player...is there a place for allografts?

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Disclosures

• Consultant: RTI Surgical, OSSUR, Arthrex, Soft Tissue Regeneration....
• Royalties: Arthrex....

Introduction

• This presentation will briefly try to answer two common questions?
  – “Is there a role for allograft tissue as a graft option in football athletes who tear their ACL?”
  – “How good are we in returning athletes to same level of competition following an ACL reconstruction?”

My experience with allograft tissue as an ACL graft option...

• I started using allograft tissue as a graft option in 1985...
• Why... due to the decreased morbidity (ie less pain, less swelling, faster recovery of motion and strength, etc.) compared to autogenous patellar tendon grafts, it was an attractive alternative....

Things I’ve learned about allograft tissue....

• (1) the tissue should NEVER be exposed to irradiation as a means of sterilization....this significantly lowers it’s clinical success due to the negative effects irradiation has on both it’s biomechanical and physiological properties....

Literature Review

• Doses as low as 2 Mrad could reduce initial stiffness and strength whereas doses of 4 Mrad or greater are necessary to kill the HIV virus
• Rappe, Indelicato et al AJSM 2007
  – 90 patients
  – Failure rate: 27% irradiated vs 2% non-irradiate
What about autograft tissue vs non-irradiated tissue ????

- "Autograft vs. Nonirradiated Allograft Tissue for ACL Reconstruction... A Systematic Review"
- Mariscalco, et al...AJSM...Aug 2013
- A review of 9 studies comparing autografts to non-irradiated allografts
- "No significant differences were found in graft failure, postoperative laxity, or patient-reported outcomes scores when comparing ACLR with autografts to allografts..."

Things I’ve learned about allograft tissue

- (2) The "ligamentization" process of turning this tissue into a viable, strong new ligament takes much longer (2x ???) than autogenous tissue....

“Ligamentization”

- Day “0”
- Day “1095”

Things I’ve learned about allograft tissue

- (3) Due to the fact that athletes feel better much sooner but that this “healing” process takes longer compared to autogenous tissue grafts, managing these athletes post-operatively is a huge challenge...
- They want to do too much too soon and therefore, place the success of the graft at risk....

“Gold Standard”

- Most Sports Medicine surgeons today will agree that the “gold standard” for reconstructing the ACL in active young athletes under the age of 25 is a autogenous patellar tendon....

Is there a roll for allograft tissue in football players ???

- YES !!!!!!....but probably this graft option should be reserved for use in multiple ligament damage (ie ACL, PCL, MCL, LCL...) or in revision cases where the primary graft was autogenous patellar tendon....
- BUT...when used, athletes must be cautioned about the slower recovery so as not to place the graft at risk too soon !!!!
How good are we in returning athletes to same level of sports after ACL reconstruction?

**Probably not as good as we think !!!!**

Perception vs Reality !!!!

- There exists a gap between *PERCEIVED* and *ACTUAL* rate of return to sports after ACL reconstruction
- There is a divergence of outcome measures and return to sports...
- Consider factors creating those gaps

Survey Says ????

- Informal survey...George Palleta, M.D.
  - 19 sports medicine orthopedists...
  - "Rate of return to same level of play on YOUR patients after ACLR?"
  - Mean = 86% (65-96%)
  - "What is the average time to return?"
  - 7.6 months (4.5-12)

What is reality?

**REALITY DOESN'T GIVE A DAMN ABOUT YOUR BELIEFS**

Meta-Analysis Data

*arder et al, BJSM 2011 June*

- Return to sports following ACLR: a systematic review and meta-analysis of the state of play.
  - Meta-analysis and systematic review
  - Electronic databases: Medline, Embase, SPORTDiscus and CINAHL
  - 48 studies, 5770 pts, mean f/u 41.5 months
  - Compared Return to Sports vs Knee Outcome Measures

Return to Sports vs Knee Outcome Measures

- Even though 90% claimed their knee was "normal or nearly normal", only 63% returned to their pre-injury level of play...
The Divergence

- Relatively low rate of return to competitive sports
- Despite high rates of successful outcome in terms of knee impairment-based function
- Suggests psychological factors may contribute to low RTP outcomes
- Fear of re-injury most common reported reason...???

Mid Term Outcomes
Ardern et al, AJSM 40, 2012

- Return to sports outcomes at 2-7 years after ACL Reconstruction
  - Case Series, Level 3, Self report questionnaire
  - 314 pts (age 32.5) @ app 40 months
  - 93% attempted sport at some time
  - 45% RTP at pre-injury level
  - 29% playing competitive sports

Delayed RTP Timetable?
Ardern et al, AJSM 43, 2015

- Sports participation 2 years after ACLR in athletes who had not returned to sport at 1 year: a prospective follow-up
  - 122 competitive and recreational-level “non-returners” 1 year s/p ACLR
  - Most athletes not playing at 1 yr had returned to the same sport @ 2 years
  - 91% attempted return to some form of sport

The MOON Group Data
McCullough KA et al, AJSM 2012

- Return to high school and college level football after ACLR:
  - Cohort study; level 3
  - Retrospective analysis of prospective patients from the MOON cohort
  - 147 players (68 HS, 26 Collegiate)
  - Return to play rates, any level
    - 63% high school, 69% collegiate

MOON Group Data

- Return to SAME level of play
  - Based on player perception
    - 43% performed at same level
    - 27% did not perform at same level
    - 30% unable to return to play at all
MOON Group Data

• Reasons for failed RTP
  – 50% stated fear of re-injury
• Differences Outcomes Measures:
  NO DIFFERENCES between RTP and non-RTP patients (IKDC, Marx Activity KOOS scores)

Systematic Review Results
Czupon S et al, BJSM 2014

• Variables associated with RTP following ACLR: a systematic review
• Medline, EMBASE, CINAHL and Cochrane
• Variables proposed to be associated with RTP following ACLR
• 16 articles

Predictive Factors

• Associations with Higher RTP
  – Higher athletic confidence
  – Higher pre-operative knee self-efficacy
  – Lower kinesiophobia
  – Higher pre-operative self-motivation

The Set-Up for Failed RTP?

• ACLR- Not exactly a 1-Way Ticket Back to Pre-injury Level: A review of contextual factors affecting return to sport after surgery
  – Medline, Embase, CINAHL, SPORTSDiscus
• Positive Predictive Factors:
  – Fear of re-injury...
  – Psychological readiness to return to sport...
  – Positive subjective assessment of knee function...

TAKE HOME MESSAGE

• Screening for potentially modifiable contextual factors, particularly psychological factors, early after ACL injury...
• May help clinicians identify athletes who could be at risk of not returning to the pre-injury level of sport...
• Institute interventions that could improve returning to sport...

More Evidence of Psychology of Success
Lentz, TA, et al AJSM. 2015

• “Comparison of physical impairment, functional and psychological measures based on fear of re-injury or pain/ lack of confidence and return to sports status after ACLR”
• Case-control study: Level 3
• “Yes: return to sport” (YRTS) or “No: return to sport” (NRTS) based on self-report
• 46 YRTS Group (63%)
• 27 NRTS Group (37%)
• NRTS subgroup subcategorized
  – NRTS – Fear of re-injury/Confidence = 14/27
  – Fear of re-injury/lack of confidence was the primary reason for NRTS
  – NRTS - Other = 13/27
• Included all other NRTS

• A paired-matched comparison of return to pivoting sports at 1 year in ACL injured patients after non-operative vs an operative course.....
• Cohort study: level 3
  – 69 patients non-operatively treated ACL pts
  – 69 operatively treated pts
  – Follow-up = 12.9 months

Return to Sports Rates: Is there a difference?
• Overall return to sports rates
  – non-operative = 68%
  – Operative = 68%
• Return to level 1 sport rates
  – Non-operative = 55%
  – Operative = 62%
  – P = .66
• Level 1 vs level 2 sports participation:
  Non-op patients in level 1 sports had a lower return to sport rate (54%) vs level 2 (88%)
  P = (.003)

Take Home Message
• Allografts have a role relative to ACL reconstruction in football players, BUT...the graft should probably be used only in multiple ligament damaged knees and the implanted should NEVER be irradiated ....

Take Home Message
• An ACL reconstruction is not a one-way ticket back to the playing field and fear of re-injury is becoming a better understood factor as to who wants to return and who does not !!!!
Thank you for your attention !!!