ORTHOSPORTS
QUESTION FOR PHYSIOTHERAPISTS

Question | My patient wants to know what graft they should have for an ACL reconstruction. How do I advise them?

Answer | This is a question asked by many patients and the answer is multifactorial. The ideal graft would be readily available, mimic the structure and function of the native ACL, incorporate quickly, have no risk of disease or rejection, not cause any donor site morbidity and be cheap. Obviously, such a graft does not exist. Each patient is unique and a different discussion needs to be had with them regarding graft choice.

The basic choices are autograft, allograft and synthetics.

Autograft:

- Patella tendon with bone blocks
- Hamstrings
- Quadriceps Tendon

Allograft:

- Irradiated
- Non Irradiated

Synthetics:

- Scaffolds
- Stents

The use of synthetics intra-articularly has failed repeatedly and in my opinion should not be considered under any circumstances. They have been associated with synovitis, lack of fibrous ingrowth, effusions and chronic instability. Synthetics can be used successfully extra-articularly in the setting of the multi-ligamentously injured knee.

Both autograft and allograft have shown excellent results overall. Unfortunately, the results using allografts for patients under the age of 25 who return to sports show a higher failure rate and should be avoided where possible. It is also important to understand that much of the American literature is from fresh frozen (non-irradiated) allografts. In Australia most of our allografts are treated with radiation to disinfect them and this alters the mechanical properties of the collagen. This may make use of these grafts less successful.

The advantages of the allograft include a faster post-operative recovery, less post operative pain, no donor site morbidity and a large variety of graft sizes and types to choose from. There have been historical estimations that HIV transmission is about 1:600,00 and bacterial infection is about 26:1,000,000. These are clearly very uncommon.

The advantages of autograft include a lower graft failure rate, no risk of disease transmission, no risk of immune reaction or infection, faster graft incorporation, the use of young healthy tissue and lower cost.

Potential Graft harvesting complications:

Patella tendon – patella fracture, articular cartilage damage, tendon rupture, anterior knee pain, kneeling pain, pain with jumping

Hamstrings – cutting the tendon during harvest, saphenous nerve injury, vein injury, residual muscle weakness and discomfort, mild knee flexion weakness (and even damage to the femoral and sciatic nerves!!)

Quadriceps tendon – technically more difficult to harvest, quadriceps strength loss, patella fracture, only one bone block, poor cosmetic appearance.

Outcomes:
The literature shows good to excellent results with almost any autograft or allograft used. Results with synthetics are considerably inferior.

This is a general guide of my thought processes:

Patella tendon:
- Any varus of the knee which will cause the graft to stretch and fail (assuming they are not in enough varus to consider a high tibial osteotomy)
- Athletes subject to hamstring issues like sprinters
- Hyperextension of the knee
- Higher level athletes and soccer players
- Loss of secondary stabilisers like menisci or stretching of the joint capsule
- Revision surgery after prior hamstring reconstruction

Hamstring Tendons:
- Open growth plates
- Cosmetic desires for smaller scars
- People that need to kneel (although this is not too much of an issue if you bone graft the patella tendon harvest site)
- Athletes that need to jump a lot
- Lower demand sports people

Allograft:
- Revision situations
- Multiligament knee injuries
- Lower activity patients in the older age groups (typically 45+)

Synthetics:
- Extra-articular only
- Last resort only

There is no one graft that is clearly superior to the others in all circumstances. The choice of graft should be personalised to the individual patient taking into consideration their age, sex, activity level, clinical examination and imaging findings.

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