

## **ACL GRAFT SELECTION**

### **WHICH GRAFT SHOULD I CHOOSE??**

Three Autograft choices (autograft meaning your own tissue is taken and used for the graft) and one Allograft choice (allograft means tissue from a donor or cadaver is taken and used for the graft).

#### **AUTOGRAPH CHOICES:**

- **Bone Patella Tendon Bone (BPTB) Autograft**

This graft is taken from the patient's own knee (i.e., autograft), usually the injured knee but can also be harvested from the non-involved side. The central third of the tendon is taken along with a piece of bone from each side of the tendon's attachments, the patella and tibial tubercle. The tendon will eventually regrow back to its original form/strength.

Advantages:

1. The tendon is close to the same length as the ligament it is replacing.
2. The bone ends of the tendon are placed into bone tunnels and this bone to bone fixation allows fast healing (6-8 weeks) with very strong fixation; thus, PT can progress aggressively
3. This graft is considered the "gold standard" and is utilized by more physicians due to its strong fixation and close resemblance to the original ACL.
4. Risk of adverse reaction is low due to patient's own tissue being harvested.

Disadvantages:

1. Increased pain at the incision sight on the front of the knee where the tendon is taken and an inability to kneel without pain for approximately 1 year.
2. Small risk in patella fracture and patella tendon rupture since a piece of the patella is removed along with the tendon during the harvest procedure.
3. An additional incision is needed and there is often a small area of permanent numbness just lateral to the incision.
4. Harvesting the patella tendon interrupts the extensor mechanism making initial quad activation difficult immediately post-operatively. Patients will have to work hard to regain quad function.

- **Hamstring (HS) Autograft**

The hamstring is comprised of three muscles: semitendonosis, semimembranosus, and biceps femoris. The hamstring autograft involves harvesting one's own semitendonosis and gracilis muscles at the inside aspect of the back of the knee and bundling them together to create an ACL graft. The soft tissue ends of the graft are placed into the femur and tibia, a soft tissue to bone fixation.

Advantages:

1. There is decreased risk of quad atrophy because the extensor mechanism is not disrupted as it is when using the patella tendon autograft. This allows for faster strength gains and rehab progression.
2. An extra incision is not needed so there should be no incisional anterior knee pain following surgery nor the complication of difficulty kneeling.
3. Risk of adverse reaction is low due to patient's own tissue being harvested

Disadvantages:

1. Because the ends of the graft are each soft tissue and are fixated to bone, this is a soft tissue to bone fixation. The fixation strength initially is not as good as a bone to bone fixation (patella tendon graft) so the healing is slower and the rehab should be progressed slower.
2. Tunnel widening of the bone tunnels in the femur and tibia may occur more frequently with this graft and has been seen as early as 3 months after surgery.
3. Unlike the patella tendon, the hamstring tendons do not regenerate and thus regaining full hamstring strength and function following surgery may be limited.
4. Because the hamstrings are harvested, initial hamstring strengthening or stretching needs to be avoided for at least 4 weeks post-operatively.

- **Quad Tendon (QT) Autograft**

The quad tendon lies just above the patella/knee cap. When removed, the surgeon can choose to remove a piece of the patella or only the tendon itself. Dr. Shybut generally leaves the patella intact and thus the graft is a soft tissue to bone fixation.

Advantages:

1. Quad tendon grafts have a thicker cross sectional area than a patellar tendon graft with about the same tensile strength.

2. Patients generally do not suffer patella tendonitis symptoms or difficulty kneeling postoperatively since the patella tendon is not disrupted. In addition, there is usually no residual numbness around the incision.
3. Risk of adverse reaction is low due to patient's own tissue being harvested

Disadvantages:

1. Because the ends of the graft are each soft tissue and are fixated to bone, this is a soft tissue to bone fixation. The fixation strength initially is not as good as a bone to bone fixation (patella tendon graft) so the healing is slower and the rehab should be progressed slower.
2. Harvesting the quad tendon interrupts the extensor mechanism making initial quad activation difficult immediately post-operatively. Patients will have to work hard to regain quad function.

#### **ALLOGRAFT CHOICE:**

- **Achilles Allograft**

This is tissue taken from a cadaver and is usually used for patients who have a less active lifestyle.

Advantages:

1. Since no tissue is taken from one's own body to make a graft, no extra healing is required and there is significantly less pain following surgery.
2. If another ACL surgery is needed, one could use his/her own tissue at that time since it wasn't harvested in the first ACL reconstruction.

Disadvantages:

1. Multiple studies have shown that tissue incorporation and graft maturation takes longer in allografts as compared to autograft tissue. As a general rule Dr. Shybut recommends delaying return to high level cutting/pivoting/agility activities until at least 9 months postoperatively, assuming appropriate rehabilitation has been done up to that point, phases 4 should be delayed 4+ weeks, and phase 5 should be delayed an additional 4+ weeks to allow greater time for graft incorporation and maturation.
2. When the graft is taken and prepared it must be freeze-dried and this kills living cells and decreases the overall strength of the tissue. Because of this, the graft is not recommended for those wanting to return to sports requiring cutting and/or jumping.