ACL reconstruction

Osteoconductive and resorbable interference screws









- Unique material
- Optimal design
- Adapted to the different surgical techniques

+ complete instrumentation set

A controlled resorption

Material

LIGAFIX[®] interference screws have been designed in Duosorb[®], biocomposite material made of **β-TCP** (Tricalcium Phosphate) and 40% **PDLLA** (Poly DL Lactic Acid). This combination provides an osteoconductive, resorbable and bioactive material while ensuring an excellent mechanical resistance and elasticity.

Tricalcium Phosphate (β-TCP) + Poly DL Lactic Acid (PDLLA)

100 % Osteoconductive 100 % Resorbable 100 % Bioactive

Mechanical strength Elasticity

In vitro et in vivo comparative study (1)





1 month Toluidine Blue x200

h **3 months** x200 Toluidine Blue x500



6 months Toluidine Blue x300

After 1 month, bone tissue is observed directly on the surface of the material. After 3 months, signs of material resorption become visible. After 6 months, implant can partially become fragmented as β -TCP particles are progressively released from the polymer matrix.

Toluidine Blue x40

In the meanwhile, pure PDLLA implants do not show signs or resorption, at every implantation time.

Implants are surrounded with conjonctive tissue containing numerous multinucleated cells.

Screws adapted to your technique



IGAFIX[®]60

Performance

30% β-TCP + 70% PDLLA

For all types of graft and overall for bone-tendon-bone transplants. Optimizes the mechanical strength, the screw is directly in contact with the bone plug.

Radiological

60% β-TCP + 40% PDLLA

Only for ligament transplants. Optimizes the kinetic of resorption.



2 heads for femoral and tibial fixation Lengths: from 20 to 35 mm Diameters : from 7 to 11 mm





⁽¹⁾ AUNOBLE S., CLEMENT D., FRAYSSINET P., HARMAND M-F., LE HUEC J-C.: «Biological performance of a new β-TCP/PLLA composite material for applications in spine surgery : In vitro and in vivo studies», Journal of Biomedical Materials Research, Part A, Art. 30749, 1-7, 2006

Surgical technique (Kenneth Jones)

1 - Patellar tendon harvest and preparation

A skin incision is made along the medial border of the patellar tendon.

The peri-tendinous is opened in reversed and raised in an L shape. The medial centre of the patellar tendon is harvested with a patellar bone plug and a tibial bone plug in "a trapezoidal shape".

Size the bone plugs with the gauge in fonction of the femoral tunnels drilling techniques (Picture 1):

Outside - Inside

The patellar osseous fragment is adjusted at the diameter of the tibial tunnel and has to pass freely in the femoral tunnel. The tibial osseous fragment is adjusted in a trapezoidal shape in order for it to jam by "press fit" in the femoral tunnel.

Inside – Outside (Blind Tunnel)

The bone plugs are respectively sized at the tibial and femoral tunnel diameter; the femoral tunnel bone plug has to pass through the tibial tunnel.

One or two holes can be made, for the lead suture, in each bone plug.

2 - Arthroscopic time (assessment and cleaning)

Menisci inspection.

Notch preparation.

Test of the remainder of the Anterior Cruciate Ligament by trying to preserve the anteromedial and posterolateral bundle.

3 - Tibial tunnel

Position of the tibial aiming device (Picture 2)

Position of the tibial aiming device (Picture 2):

Place the hook of the tibial aiming device through the anteromedial portal into the posterior fibres of the ACL remains (angle between approximately 55° and 65° with the axis of the tibial shaft, the superior branch of the aiming device parallel to the plan of the tibial lapboard).

Next, mount the guide pin sleeve on the aiming device then insert the ø2.5mm Kirchner guide pin. The articular surface can be protected by a curette. The guide pin is removed under arthroscopic control.

Drilling of the tibial tunnel (Picture 3)

Remove the aiming device and overdrill the tibial tunnel on guide pin, first with the Ø 6mm drill bit (1) and then with the definitive diameter of drill bit required (2). Between the two drillings, it is possible to reposition the guide pin for the site that is most anatomical under arthroscopic control.

Once the tibial tunnel has been created, it can be plugged up with a stopper, to restrict irrigation fluid loss.

4 - Femoral tunnel: two options:

OUTSIDE-INSIDE TECHNIQUE

Position of the femoral aiming device (Picture 4)

With the knee in 70 degrees of flexion, pass the femoral aiming device through the anteromedial portal and position the hook under arthroscopic control in order to obtain an anatomical position of the guide pin. Classically, the aiming device can be placed against the posterior edge of the lateral condyle at 11 o'clock with a 45° angle with regard to the tibial plate plan and oriented 20° from back to front.

Then, place the guide pin sleeve on the aiming device and insert the Ø2.5mm Kirchner guide pin using a hand piece, its output is protected by the pallette of the aiming device.

Drilling of the femoral tunnel (Picture 4.1)

Remove the aiming device then overdrill over the guide pin first at a diameter of 6mm and then at the definitive diameter.

Passage of the graft through the tibial and femoral tunnels

A passing suture passed from the tibial tunnel to the femoral tunnel to the metallic thread-strainer, is recovered through the femoral tunnel (with a Kelly pliers for example) then fixed to the traction thread of the graft. The graft is gradually passed from the femur to the tibia, patellar fragment first, checking the intra-articular

The graft is gradually passed from the femur to the tibia, patellar fragment first, checking the intra-articular passage.

Once the patellar fragment is introduced into the tibial tunnel, the femoral bone plug (trapezoidal shape) is softly impacted to the graft-puncher into the femoral tunnel until outcrop of the intra-articular part of the condyle.

During this action, the plug in the tibia is in permanent traction in order to facilitate the graft passage.

In this technique, femoral graft fixation is obtained by the transplant press-fitting into the femoral tunnel and with an interference screw in the tibial tunnel (Picture 4.2).













BLIND TUNNEL TECHNIQUE

Position of the pistol-grip aiming device (Picture 4)

Trans-tibial way

With the knee in flexion between 70 degrees and 90 degrees, pass the pistol-grip femoral aiming device through the tibial tunnel and position the hook against the posterior edge of the lateral condyle (aiming device ø 9mm= tunnel ø 9mm or below, aiming device ø 10mm= tunnel ø 10mm and above).

Antero-medial way

With the knee in hyper flexion at 120 degrees, pass the pistol grip femoral aiming device through the anteromedial portal and position the hook of the pistol grip femoral aiming device against the posterior edge of the lateral condyle.

The gap between the hook of the pistol grip femoral aiming device and the posterior edge of the lateral condyle is 6.4 mm with the \emptyset 9 mm aiming device and of 6.9 mm with the \emptyset 10 mm aiming device.

Drilling of the femoral tunnel (Picture 4.1)

The knee in the hyper flex position, introduce the 2.5mm the eyelet pin into the pistol grip aiming device and push it to just beyond the lateral femoral cortex, then through the skin.

Under arthroscopic control, retrieve the pistol grip aiming device and ream on the guide pin the tunnel to a depth matching the length of the graft bone plug, with the corresponding reamer. The passage of an intermediary diameter reamer could be necessary.

Passage of the graft through the tibial and femoral tunnels (Picture 4.2)

Trans-tibial way

The traction thread, first fastened to the patellar fragment and passed through the eye of the drill, is pulled with the guide pin from the tibial tunnel to the femoral tunnel.

Progressively pass the transplant from the tibial tunnel to the femoral tunnel with the traction thread.

Antero-medial way

The traction thread, first passed through the eye of the pin, is pulled with the guide pin from the anteromedial portal to the femoral tunnel, and then recovered in the tibial tunnel with the Kellys pliers. The traction thread fixed to the graft is progressively passed from the tibial tunnel to the femoral tunnel from the bottom to the top.

Femoral fixation with LIGAFIX 30 screw (Picture 5)

Keep the knee in the right position of flexion. The graft in place, the guide pin of the screw is pulled through the anteromedial portal between the face of the tunnel and the spongy face of the graft bone plugs (\emptyset 0.9 mm for the screws less or equal to 8mm in diameter and \emptyset 1.4 mm for the screws equal or greater to 9 mm in diameter). The use of the guide pin sleeve (for the \emptyset 0.9 mm guide pin) can be necessary to the good positioning of the guide pin. It is recommended to set the guide pin in the spongy bone.

Prepare the entrance of the tunnel by using the cannulated tap screwdriver.

Fix the graft with the resorbable interference screw Ligafix 30 and the adapted screwdriver (green srewdriver for ø 7, 8mm screws and blue screwdriver ø 9, 10 and 11 mm screws). The screw is introduced on the guide pin between the tunnel face and the spongy face of the graft bone plug so that the screw comes to the limit of the articular surface, at 1mm behind. The screw diameter is 1mm inferior to the diameter of the tunnel.

Remove the guide pin. Check the good kinematics of the graft before the tibial fixation.

Tibial fixation with LIGAFIX 30 screw for the two techniques (Picture 6)

Under control of the arthroscope, pass the guide pin (\emptyset 0.9 mm for the screws of an inferior or equal diameter of 8mm and \emptyset 1.4 mm for the screws of a superior or equal diameter of 9 mm) between the tunnel face and the spongy face of the graft bone plug.

Prepare the entrance of the tunnel by using the cannulated tap screwdriver.

The screw is placed on the screwdriver. The chosen screw diameter should be 1mm less than the tunnel diameter.

The drill serving as a guide, the screwing is made so that the screw comes to the limit of the articular exit of the tunnel, but without passing it by. It is recommended to maintain the guide pin with intracular pliers during the screwing.

Remove the guide pin.



Surgical technique (Semi-T & Gracilis)

1 - Hamstring tendon harvest and preparation (Picture 1)

Following a 2 to 3 centimetres skin incision, harvest the gracilis with the "stripper" which breaks it off all along its length.

Then, harvest the semitendinosus.

Once harvested and cleaned, these tendons are fold in two and sutured in order to obtain a quadruple ligament.

Ajust the graft size using the graft gauge.

2 - Arthroscopic time (assessment and cleaning)

Menisci inspection.

Notch preparation.

Test of the remainder of the Anterior Cruciate Ligament by trying to preserve the antero medial and posterolateral bundle.

3 - Tibial tunnel

Position of the tibial aiming device (Picture 2)

Place the hook of the tibial aiming device through the anteromedial portal into the posterior fibres of the ACL remains (angle between approximately 55° and 65° with the axis of the tibial shaft, the superior branch of the aiming device parallel to the plan of the tibial lapboard).

Next, mount the guide pin sleeve on the aiming device then insert the ø 2.5mm Kirchner guide pin. The articular surface can be protected by a curette. The guide pin is removed under arthroscopic control.

Drilling of the tibial tunnel (Picture 3)

Remove the aiming device and overdrill the tibial tunnel on guide pin, first with the ø 6mm drill bit (1) and then with the definitive diameter of drill bit required (2). Between the two drillings, it is possible to reposition the guide pin for the site that is most anatomical under arthroscopic control.

Once the tibial tunnel has been created, it can be plugged up with a stopper, to restrict irrigation fluid loss.

4 - Femoral tunnel

Position of the pistol-grip aiming device (Picture 4)

Trans-tibial way

With the knee in flexion between 70 degrees and 90 degrees, pass the pistol-grip femoral aiming device through the tibial tunnel and position the hook against the posterior edge of the lateral condyle (aiming device ø 9mm= tunnel ø 9mm or below, aiming device ø 10mm= tunnel ø 10mm and above).

Antero-medial way

With the knee in hyper flexion at 120 degrees, pass the pistol grip femoral aiming device through the anteromedial portal and position the hook of the pistol grip femoral aiming device against the posterior edge of the lateral condyle.

The gap between the hook of the pistol grip femoral aiming device and the posterior edge of the lateral condyle is 6.4 mm with the ø 9 mm aiming device and of 6.9 mm with the ø 10 mm aiming device.

Drilling of the femoral tunnel (Picture 4.1)

The knee in the hyper flex position, introduce the 2.5mm the eyelet pin into the pistol grip aiming device and push it to just beyond the lateral femoral cortex, then through the skin.

Under arthroscopic control, retrieve the pistol grip aiming device and ream on the guide pin the tunnel to a depth matching the length of the transplant with the corresponding reamer. The passage of an intermediary diameter reamer could be necessary.











Passage of the graft through the tibial and femoral tunnels (Picture 4.2)

Trans-tibial way

The traction thread, first fastened to the transplant and passed through the eye of the pin, is pulled with the guide pin from the tibial tunnel to the femoral tunnel. Progressively pass the transplant from the tibial tunnel to the femoral tunnel with the traction thread.

Antero-medial way

The traction thread, first passed through the eye of the pin, is pulled with the guide pin from the anteromedial portal to the femoral tunnel, and then recovered in the tibial tunnel with the Kellys pliers. The traction thread fixed to the graft is progressively passed from the tibial tunnel to the femoral tunnel from the bottom to the top.

Femoral fixation with LIGAFIX 60 screw (Picture 5)

Keep the knee in the right position of flexion. The graft in place, the guide pin of the screw is pulled through the anteromedial portal between the face of the tunnel and the face of the bundle of the ligament (\emptyset 0.9 mm for the screws less or equal to 8mm in diameter and \emptyset 1.4 mm for the screws equal or greater to 9 mm in diameter). The use of the guide pin sleeve (for the \emptyset 0.9 mm guide pin) can be necessary to the good positioning of the guide pin. It is recommended to set the guide pin in the spongy bone.

Prepare the entrance of the tunnel by using the cannulated tap screwdriver.

Fix the graft with the resorbable interference screw Ligafix 60 and the adapted screwdriver (green srewdriver for ø 7, 8mm screws and blue screwdriver ø 9, 10 and 11 mm screws). The screw is introduced on the guide pin between the tunnel face and the face of the bundle of the ligament so that the screw comes to the limit of the articular surface, at 1mm behind. The screw diameter is 1mm inferior to the diameter of the tunnel.

Remove the guide pin.

Once the graft fixed at the femoral nivel, extend the graft at the tibial nivel with pliers (Picture 6).

Check the good kinematics of the graft before the tibial fixation.

Tibial fixation with LIGAFIX 60 screw (Picture 7)

Under control of the arthroscope, pass the guide pin (\emptyset 0.9 mm for the screws of an inferior or equal diameter of 8mm and \emptyset 1.4 mm for the screws of a superior or equal diameter of 9 mm) between the tunnel face and the face of the bundle of the ligament.

Prepare the entrance of the tunnel by using the cannulated tap screwdriver.

The screw is placed on the screwdriver. The chosen screw diameter should be at the minimum equal to the tunnel diameter.

The pin serving as a guide, the screwing is made so that the screw comes to the limit of the articular exit of the tunnel, but without passing it by. It is recommended to maintain the guide pin with intracular pliers during the screwing.

Remove the guide pin.









Blind tunnel instrumentation



Bling tunnel instrumentation - references

Codes	Designation	In the basket
11G9000034	Tibial aiming device	1
LIG9000032	Guide pin sleeve for aiming device	1
LIG9008VER	Green screwdriver for screws ø 7, 8 mm	1
LIG9009BLE	Blue screwdriver for screws ø 9, 10 and 11 mm	1
LIG9006048	Drill bit ø 6 mm	1
LIG9007048	Drill bit ø 7 mm	1
LIG9008048	Drill bit ø 8 mm	1
LIG9009048	Drill bit ø 9 mm	1
LIG9010048	Drill bit ø 10 mm	1
LIG9011048	Drill bit ø 11 mm	1
LIG9109400	Rigid guide pin ø 0,9 mm - length 400 mm for ø 7, 8 mm screws screwdriver	1
LIG9114400	Rigid guide pin ø 1,4 mm - length 400 mm for ø 9, 10, 11 mm screws screwd	river 1
LIG9125300	Guide pin (K-Wire) ø 2,5 mm for drill bits	1
LIG9000035	Graft gauge	1
LIG9000051	Stopper	1
LIG9000041	Eyelet pin - length 400 mm	1
LIG9008049	Reamer ø 8 mm	1
LIG9009049	Reamer ø 9 mm	1
LIG9010049	Reamer ø 10 mm	1
LIG9009B45	Pistol-grip femoral aiming device ø 9 mm	1
LIG9010B45	Pistol-grip femoral aiming device ø 10 mm	1
LIG9000169	Tap screwdriver ø 7 mm	1
LIG9000093	Tap screwdriver ø 8, 9, 10 mm	1
LIG9000092	Guide pin introducer for guide pin ø 0,9 mm	1
LIG90TB001	LIGAFIX Blind Tunnel stainless steel basket with silicones	1
LIG90TB000	LIGAFIX complete Blind Tunnel instrumentation set	

Outside-inside instrumentation



Femoral aiming device

Outside-inside instrumentation - references

Codes	Designation	n the basket
LIG9000034	Tibial aiming device	1
LIG9000029	Femoral aiming device	1
LIG9000032	Guide pin sleeve for aiming device	1
LIG9008VER	Green screwdriver for screws ø 7, 8 mm	1
LIG9009BLE	Blue screwdriver for screws ø 9, 10 and 11 mm	1
LIG9006048	Drill bit ø 6 mm	1
LIG9007048	Drill bit ø 7 mm	1
LIG9008048	Drill bit ø 8 mm	1
LIG9009048	Drill bit ø 9 mm	1
LIG9010048	Drill bit ø 10 mm	1
LIG9011048	Drill bit ø 11 mm	1
LIG9000092	Guide pin introducer for guide pin ø 0,9 mm	1
LIG9109400	Rigid guide pin ø 0,9 mm - length 400 mm for ø 7, 8 mm screws screwdriver	1
LIG9114400	Rigid guide pin ø 1,4 mm - length 400 mm for ø 9, 10, 11 mm screws screwdr	iver 1
LIG9125300	Guide pin (K-Wire) ø 2,5 mm for drill bits	1
LIG9000035	Graft gauge	1
LIG9000051	Stopper	2
LIG9000169	Tap screwdriver ø 7 mm	1
LIG9000093	Tap screwdriver ø 8, 9, 10 mm	1
LIG90DD001	LIGAFIX Outside Inside stainless steel basket with silicones	1
LIG90DD000	LIGAFIX complete Oustide Inside instrumentation set	

Ligafix 30 references



Rounded head screw

adapted to femoral and tibial fixation

Optimal protection of the graft. **Femoral level:** preserves the graft during articular flexion. **Tibial level:** ensures optimal locking.

Codes

Designation

COM3007020	LIGAFIX 30 rounded head interference screw ø 7 mm - length 20 mm	1	
COM3007025	LIGAFIX 30 rounded head interference screw ø 7 mm - length 25 mm	1	
COM3007030	LIGAFIX 30 rounded head interference screw ø 7 mm - length 30 mm	1	
COM3008025	LIGAFIX 30 rounded head interference screw ø 8 mm - length 25 mm	1	
COM3008030	LIGAFIX 30 rounded head interference screw ø 8 mm - length 30 mm	1	
COM3008035	LIGAFIX 30 rounded head interference screw ø 8 mm - length 35 mm	1	
COM3009025	LIGAFIX 30 rounded head interference screw ø 9 mm - length 25 mm	1	
COM3009030	LIGAFIX 30 rounded head interference screw ø 9 mm - length 30 mm	1	
COM3009035	LIGAFIX 30 rounded head interference screw ø 9 mm - length 35 mm	1	
COM3010R25	LIGAFIX 30 rounded head interference screw ø 10 mm - length 25 mm	1	
COM3010R30	LIGAFIX 30 rounded head interference screw ø 10 mm - length 30 mm	1	
COM3010R33	LIGAFIX 30 rounded head interference screw ø 10 mm - length 33 mm	1	
COM3010R35	LIGAFIX 30 rounded head interference screw ø 10 mm - length 35 mm	1	

Flat head screw

adapted to tibial fixation



Packaging

Optimal protection of the graft. Insertion facilitated at the end of the screwing.

Codes

Designation

COM3010030LIGAFIX 30 flat head interference screw ø 10 mm - length 30 mm1COM3010035LIGAFIX 30 flat head interference screw ø 10 mm - length 35 mm1COM3011030LIGAFIX 30 flat head interference screw ø 11 mm - length 30 mm1COM3011035LIGAFIX 30 flat head interference screw ø 11 mm - length 35 mm1

For an optimal use, the diameter of the tunnel drilling has to be adapted to the screw's diameter and to the technique: KJ's Technique: ø of the screw superior of 1mm or equal to ø of the drill. Hamstrings Tendons Technique: ø of the screw equal to ø of the drill.

Packaging

Rounded head screw

Designation

adapted to femoral and tibial fixation

Optimal protection of the graft. **Femoral level:** preserves the graft during articular flexion. **Tibial level:** ensures optimal locking.

Codes

Codes

COM6007020	LIGAFIX 60 rounded head interference screw ø 7 mm - length 20 mm	1
COM6007025	LIGAFIX 60 rounded head interference screw ø 7 mm - length 25 mm	1
COM6007030	LIGAFIX 60 rounded head interference screw ø 7 mm - length 30 mm	1
COM6008025	LIGAFIX 60 rounded head interference screw ø 8 mm - length 25 mm	1
COM6008030	LIGAFIX 60 rounded head interference screw ø 8 mm - length 30 mm	1
COM6008035	LIGAFIX 60 rounded head interference screw ø 8 mm - length 35 mm	1
COM6009025	LIGAFIX 60 rounded head interference screw ø 9 mm - length 25 mm	1
COM6009030	LIGAFIX 60 rounded head interference screw ø 9 mm - length 30 mm	1
COM6009035	LIGAFIX 60 rounded head interference screw ø 9 mm - length 35 mm	1
COM6010R25	LIGAFIX 60 rounded head interference screw ø 10 mm - length 25 mm	1
COM6010R30	LIGAFIX 60 rounded head interference screw ø 10 mm - length 30 mm	1
COM6010R33	LIGAFIX 60 rounded head interference screw ø 10 mm - length 33 mm	1
COM6010R35	LIGAFIX 60 rounded head interference screw ø 10 mm - length 35 mm	1

Flat head screw

adapted to tibial fixation

Optimal protection of the graft. Insertion facilitated at the end of the screwing.

COM6010030	LIGAFIX 60 flat head interference screw ø 10 mm - length 30 mm	1
COM6010035	LIGAFIX 60 flat head interference screw ø 10 mm - length 35 mm	1
COM6011030	LIGAFIX 60 flat head interference screw ø 11 mm - length 30 mm	1
COM6011035	LIGAFIX 60 flat head interference screw ø 11 mm - length 35 mm	1

Designation

For an optimal use, the diameter of the screw has to be at the minimum equal to the drill's diameter.

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Packaging



IGAFIX[®]60

Ligafix 60 references

Ref: V5.0112

Packaging

Ref: