CASE REPORTS

1. CR_Fixation of Patella Fracture Using Activa™ –Products

2. CR_Fixation of Malleolar Fracture Using Activa™

3. CR_Fixation of Malleolar Fracture Using Activa™ –Pins

4. CR_Fixation of OCD Using Activa™ –Pins

5. CR_Hallux Valgus with ActivaPin™ and ActivaNail™

6. CR_Clinical Application of PLGA Resorbable Screw Fixation in Forefoot Surgery
Fixation of Patella Fracture Using Activa™ -Products

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### Operator:
- **Operator:** Esa Partio
- **Dg no.:** S82.0
- **DG:** Fractura patellae I sin cum luksatio patellae
- **Injury date:** 22.4.2008
- **Operation date:** 24.4.2008
- **Operation time:** 40 min
- **Hospital stay:** 1 days
- **Sick leave:** 45 days
- **Bloodless field during operation:** Yes
- **Prophylactic antibiotics:** Yes

### Implant 1:
- **Implant:** ActivePin REF B-AP-2030
- **LOT:** S7001
- **Implant performed:** Excellent
- **Drilling:** K-wire

### Implant 2:
- **Implant:** ActiveScrew REF B-AS-4545
- **LOT:** S8005
- **Implant performed:** Excellent
- **Drilling:** Drill bit

### Operation:
- **Operation:** Fracture
- **Operation no.:** NGJ50
- **Immobilisation:** Functional brace
- **Prim. weight bearing:** Partial weight bearing after 3 weeks
- **Sec. weight bearing:** Full weight bearing after 6 weeks

---

**Extra notices:**
Badminton injury (no impact). One larger fragment and few smaller osteochondral fragments were fractured off the patella. One of the fragments was intra-articular (fixed with two pins). Next planned follow up point was 6 months, but the patient did not come to the scheduled visit. At 4 years follow up call patient was satisfied with the knee. Only thing reminding about the injury is slight crepitation of the femoro patellar joint.
2 Case Description

Patient was an 18 year old normal weight sports active male. The fracture of patella occurred while playing badminton due to subluxation of the patella. In the preoperative X-ray and MRI a dislocated 26 x 15 mm fracture was found at the medial side of the patella. In addition to that main fragment loose osteochondral fragments were found around the main fracture.

Figure 1 Preoperative MRI showing 26 x 15 mm bone fragment on the medial side of the patella.

Figure 2 Preoperative X-ray shows the fracture line on the medial side and loose osteochondral fragment on the lower lateral corner.

In addition to Bone fractures in the MRI a tear of MPFL (Medial Patello Femoral Ligament) and medial retinaculum were found.
3 Surgical procedure

Longitudinal incision was made over the whole length of the patella. Main fragment was fixed using one ActivaScrew™ 4.5 mm fully threaded. The head was cut off using a hot loop after insertion of the screw.

![Figure 3](image1.png)

**Figure 3** Left: Insertion of a ActivaScrew™ 4.5 mm  Right: Cutting of the head using a hot loop

A loose osteochondral fragment was fixed using two ActivaPin™ 2.0 mm. After insertion proximal protruding part of the pin was cut off using a hot loop.

![Figure 4](image2.png)

**Figure 4** Left: insertion of ActivaPin™ 2.0 mm  Right: Osteochondral fragment fixed with 2 pieces of ActivaPin™ 2.0 mm

As a postoperative care a functional brace was applied. Partial weight bearing was allowed at 3 weeks and full weight bearing at 6 weeks.
4 Results

Postoperative course was uneventful. Although radiological evaluation revealed malposition of one of the osteochondral fragments, bone healing took place and the patient was able to return to normal sport activities 6 weeks postoperatively.

![Figure 5](image.jpg)

Figure 5 6 weeks postoperatively mountain view and lateral view x-rays show healing of the main fracture and inaccuracy in position of one of the osteochondral fragments.

Late follow-up was performed by telephone 4 years later. The knee was painless. The patient was able to do similar sport activities as before operation. Only slight crepitation of the patellofemoral joint without pain was still noticed. In follow-up later radiographical examination was not carried out, because the healing process was good without complications.

5 Discussion

ActivaScrew™ 4.5 mm is well suitable for fixation of large patellar fractures. The ActivaPin™ 2.0 mm is a practical tool in fixing small osteochondral fragments. To gain sufficient holding power in fixation of osteochondral fragments with ActivaPin™, the pins are preferably placed in bone in different angles to create a firm form lock. It’s imperative to cut the implants flush with the bone surface to avoid soft tissue irritation during degradation of the bioabsorbable material of the pins or screws. In intra articular fixation pins can be placed through the cartilage. In that case they must be inserted to the level of bone to avoid the joint irritation.
6 Related literature

[1] Hirvensalo E; Absorbable synthetic self-reinforced polymer rods in the fixation of fractures and osteotomies; Thesis 1990; University of Helsinki

[2] Partio Esa K; Absorbable screws in the fixation of cancellous bone fractures and arthrodeses; Thesis 1992; University of Helsinki

[3] Tuompo Pertti; Bioabsorbale implants in knee surgery; Thesis 2004; University of Helsinki


7 Contact info

- Information concerning the case:

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  Tel. +358 20 778 9500
  Email sales@bioretec.com
Fixation of Malleolar Fracture Using Activa™ -Screws

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### Operator:
- Operator: Esa Partio
- Dg no.: S82.6
- DG: Fractura malleoli lateralis l sin et Ruptura ligamenti delt.
- Operation: Fracture
- Operation no.: NHJ12
- Injury date: 23.1.2008
- Immobilisation: Partial weight bearing
- Operation date: 28.1.2008
- Prim. weight bearing: Functional brace
- Operation time: 25 min
- Sec. weight bearing: Full weight bearing at 6 weeks
- Hospital stay: 1 days
- Sick leave: 90 days
- Bloodless field during operation: Yes
- Prophylactic antibiotics: No

### Implant 1:
- Implant: ActivaScrew REF B-AS-4550
- Implant performed: Excellent
- LOT: S7041
- Drilling: Drill bit

### Implant 2:
- Implant: -
- Implant performed: Excellent
- LOT: S7401
- Drilling: Drill bit

### Operation:
- Operation: No technical difficulties
- Notice: Head of both screws were cut off with an oscillating saw.

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### Extra notices:
- The injury was a skiing injury (Failed jump on a snow board -> high energy injury). Post operatively pain persisted during the sport activities up to 2 years at which point a relatively large os trigonum was surgically removed at the posterior side of the talus. The pain was relieved after this operation.
2 Case Description

Patient was an 18 year old normal weight sports active male, with high energy snowboarding injury. Preoperative X-ray revealed 4 mm dislocated Weber B –type lateral malleolus fracture with rotational mal position. Ankle mortise widening was also evident based on the preoperative x-ray showing total deltoid ligament torn.

3 Surgical procedure

The fracture was fixed through the lateral incision with two fully threaded ActivaScrew™ 4.5 x 50 mm bioabsorbable screws. Heads of the both screws were cut off using an oscillating saw. The lengths of the screw sections remaining in the bone were 40 and 45 mm. Deltoid ligament was sutured through a medial incision and through the drill holes in medial malleolus.

As a postoperative immobilization a functional brace was applied. Partial weight bearing was allowed at 3 weeks and full weight bearing at 6 weeks.
4 Results

Postoperative course was uneventful with excellent clinical and radiological results. During sport activities, pain persisted on the anterior and medial side of the ankle. At 1 year 8 months x-ray revealed good bone healing and stable ankle mortise. Channels of the bioabsorbable screws are clearly visible. The large os trigonum was noted at the posterior side of the talus.

![X-ray Image](image)

Figure 3  X-ray at 1 year 8 months showing firm bony union.

Os trigonum was surgically removed roughly 2 years after the fracture fixation to relief the pain that still persisted during the sport activities. After removal of the os trigonum pain was relieved and at 4.5 year follow up the patient was very satisfied with the end result.

5 Discussion

Functional result of the operation was excellent. ActivaScrew™ 4.5 mm is well suitable for fixation of malleolar fractures. The screws can be cut to sufficient length with an oscillating saw intraoperatively.

In this kind of fractures os trigonum may also be displaced and cause long lasting pain. This condition can be verified by MRI imaging due to visualization of the oedema around the os trigonum.
6 Related literature


[3] Joukainen A, New Bioabsorbable Implants for the Fixation of Metaphyseal Bone, An Experimental and Clinical Study; Doctoral dissertation, Faculty of Medicine of the University of Kuopio; 2008

7 Contact info

• Information concerning the case:
  
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  Finland
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  Email sales@bioretec.com
Fixation of Malleolar Fracture Using Activa™ -Pins

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#### Implant 1:
- **Implant**: ActivaPin
- **REF**: B-AP-2030
- **LOT**: S7002
- **Implant performed**: Excellent
- **Drilling**: Drill bit

#### Implant 2:
- **Implant**: ActivaPin
- **REF**: B-AP-2030
- **LOT**: S7002
- **Implant performed**: Excellent
- **Drilling**: Drill bit

| Notice | Good compression |

| Extra notices: | The same foot was operated again at 2.5 years for removal of neurinoma between third and fourth metatarsal bone. MRI imaging of the foot was carried out at that time. At 5 years patient needs to use occasional medication for pain due to multiarticular arthrosis. |
2 Case Description

Patient was a 58 year old normal weight female, with Weber-A type lateral malleolar fracture. Primary treatment was done conservatively with 6 weeks plaster cast immobilization. Pain persisted and clinical examination suggested a non union of the fracture. MRI investigation confirmed the non union of the fracture and thus patient was operated 7 months after the injury. The Figure below shows the MRI finding.

![Figure 1 Preoperative MRI showing non-union of conservatively treated Weber-A type malleolar fracture.](image)

3 Surgical procedure

Two Bioretec’s ActivaPin™ implants were used in angle to create rigid stability and compression to the fragment line. Drilling was performed (in situ) through the proximal cortex creating a good cortical platform for the implant. Both implants were fully inserted and proximal heads of the pins were sunk 1 mm under the cortical level. Insertion feel was smooth and pins slid in easily with good friction. During the insertion when pin went through the fixation line, blood came out of the fixation line indicating good compression already after insertion of the first implant.
As a postoperative care a functional brace was applied. Full weight bearing was allowed after 6 weeks.

4 Results

At 5 weeks post operative X-ray union of the fracture was seen.

The fracture healed well with exact position and pain in the ankle was relieved. Patient, however, claimed increasing pain in the forefoot. At 2 years 6 weeks MRI investigation was carried out to find a cause for the pain. X-ray was also taken to out rule reoccurring of the non union of the treated fracture.
In the MRI investigation a neurinoma between 2\textsuperscript{nd} and 3\textsuperscript{rd} metatarsal was found and later on surgically removed. Forefoot pain was relieved. At 5 year follow up the patient reports pain in the ankle again. The cause of the pain is diagnosed to multiarticular arthrosis of the tarsal joints.

5 Discussion

A non union after failed conventional treatment of a Weber-A type malleolar fracture was successfully treated with two ActivaPin implants. At 2 years 6 months hardly any signs of the implant holes are visible in MRI, thus the implant has degraded and channels filled almost completely.

During the operation good compression of the fracture was achieved due to grooved pin surface. Grooved surface of the pin facilitates easy insertion and good holding power.

6 Related literature


7 Contact info

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  Finland  
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  Email sales@bioretce.com
Fixation of Osteochondritis dissecans Using Activa™ -Pins

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1 Summary table

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Operator: Esa Partio

Dg no.: M93.2
DG: OCD genu l dx
Injury date: -
Operation date: 25.3.2009
Operation time: 20 min
Hospital stay: 1 day
Sick leave: 45 days
Bloodless field during operation: Yes
Prophylactic antibiotics: No

Implant 1:
- ActivaPin REF B-AP-2030
- LOT: S8032
- Implant performed: Excellent
- Drilling: K-wire

Implant 2:
- ActivaPin REF B-AP-2030
- LOT: S8032
- Implant performed: Excellent
- Drilling: K-wire

Operation: -
Notice: -

Primary 3 weeks 3 months 6 months 1 year Call 3 Years
Operator: Esa Partio Esa partio Esa partio Esa Partio - Esa Partio
Obj. result: Excellent Excellent Excellent Moderate - Good
Subj. result: Fair Fair Excellent Moderate - Moderate
Primary position: Exact Exact Exact Exact - -
Bone union: Non-union - - Delayed - -
Swelling: No No No No Slight - No
Redness: No No No No - No
Second operation: No No No No - No
Range of motion: Def. 10-30deg. Normal Normal Def. <10 deg - Normal
Sports activities: Ended activities Changed activities Like before Changed activities - Changed activities
Tissue reaction: No No No No - No
Infection: No No No No - No
Thrombosis: No No No No - No
Radiol. final posit.: Stable Stable Stable Stable - -

Extra notices: After 6 months the posterior side of the knee was a little painful during sport activities. Control MRI was performed. MRI finding showed good progress in healing of the OCD and fluid accumulation around the popliteal ligament at the posterior side of the knee explaining the pain feeling during the sport activities.
2 Case Description

Patient was a 15 year old normal weight sports active male, with diagnosed Osteochondritis dissecans (OCD) in the right knee. In clinical examination in addition to OCD pain was noted around the popliteal tendon at the posterior side of the knee. MRI investigation was carried out in order to confirm the diagnosis.

Figure 1 Preoperative MRI of the knee with one OCD lesion on the lateral femoral condyle.

MRI investigation revealed OCD lesion at the lateral femoral condyle and slight fluid accumulation around the popliteal tendon. Operative treatment of the OCD lesion was decided.

3 Surgical procedure

Both ActivaPin™ 2.0 x 30 mm implants were fully inserted with ActivaPin™ Arthroscopic Pin Applicator and mallet. Drill holes were drilled slightly non parallel to achieve good stability to the fixation.
As a postoperative regimen free mobilization with partial weight bearing was applied for three weeks.
4  Results

At 2 months postoperatively X-ray investigation was carried out to evaluate the stability of the OCD lesion.

The x-ray evaluation at 2 months post operatively revealed a stable OCD fragment.

At 6 Months MRI investigation was carried out in order to evaluate the healing of the OCD lesion.

![Figure 3 2 months postoperative X-ray.](image)

![Figure 3 Left: Angled direction the pins](image)  ![Figure 3 Right: AP-view](image)
Six months postoperatively early signs of healing of the OCD lesion was noted around the pin channels in the MRI investigation. Fluid accumulation around the popliteal ligament was also slightly increased comparing to the preoperative MRI.

After healing of the OCD the patient returned to sport activities. However, still 3 years after the operation pain at the posterior side of the knee limited the sport activities.

5 Discussion

Result of the operation was good and patient was able to continue his semi-professional sport activities. Operation was easy to make and insertion feel of the both pins was smooth and pins slid in steadily with good friction. Grooved surface enables stable fixations even with small fragments. Instrument’s ability to sink implant's proximal head slightly under the cartilage level secures fixation and allows tissue growth over the implant closing the channel to the joint. The pain at the posterior side of the knee noted at 3 year follow up most likely is caused by the irritation of the popliteal ligament. Further investigations are needed in solving this problem.

6 Related literature

7  Contact info

- Information concerning the case:

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  Email: partio@kolumbus.fi

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Hallux Valgus Correction using ActivaPin™ and ActivaNail™

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**Operator:** Heikki Mäenpää  
**Dg no.:** M46.9 and M20.1  
**DG:** Spondyloarthropatia NAS, hallux valgus, metatarsalgia

**Operation no:** NHK40 X2 and NHK99  
**Operation:** Osteotomia metatarsus nro I (chevron) et osteotomia metatarsus nro II (weil), capsuloplastia MTP I, tenotomia t. adductor hallucis

**Injury date:** -  
**Operation date:** 29.3.2012  
**Operation ti:** 44 min  
**Hospital stay:** 1 day  
**Sick leave:** 56 days  
**Bloodless field during operation:** Yes  
**Prophylactic antibiotics:** No

**Implant 1:** ActivaPin REF B-AP-2040  
**Implant performed:** Good  
**LOT:** S11022  
**Drilling:** K-wire

**Implant 2:** ActivaNail REF B-ANC-2015  
**Implant performed:** Good  
**LOT:** S9062  
**Drilling:** K-wire

<table>
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<th></th>
<th>Primary</th>
<th>6 w weeks</th>
<th>8 w weeks</th>
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<tr>
<td>Obj. result:</td>
<td>Heikki Mäenpää</td>
<td>Good</td>
<td>Good</td>
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<tr>
<td>Subj. result:</td>
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<td>Radiol. final posit.:</td>
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<td>-</td>
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**Notice:** At 6 weeks redness and swelling persisted. Staphylococcal infection (erysipelas) was suspected and cephalosporine antibiotic was prescribed for 10 days (750mg x 2/day). Redness resolved well in two weeks, but some swelling still persisted. Cause of the swelling is most likely a mal function in the blood circulation of the feet.
2 Case Description
The patient was a 43-year-old female with a medical history of spondyloarthropathy, obesity, and fibromyalgia. She was admitted to hospital because of painful hallux valgus of the right foot and metatarsalgia. Preoperative x-ray examination showed mild osteoarthritis of the first MTP joint with hallux valgus angle (HVA) 29˚ and intermetatarsal angle (IMA) 15˚. Metatarsalgia and osteoarthritis of the second metatarsal head was caused by the osteochondritis as a consequence of the Freiberg's disease. The left foot had hallux valgus angle (HVA) 18˚ and intermetatarsal angle (IMA) 12˚.

Figure 1 Preoperative x-ray with hallux valgus angle (HVA) and intermetatarsal angle (IMA) drawn on the picture.
In order to relieve the pain and restore the normal anatomy of the foot operative treatment was decided with chevron osteotomy of the first metatarsal head and soft tissue reconstruction. In addition well ostetomy was decided to be carried out on second metatarsal as a decompressive procedure.

2 Surgical procedure

Procedure was started with soft tissue manipulation. Skin incision was made in the web space between the first and second metatarsals. Distal end of the adductor tendon and lateral sesamoid were released.
A full thickness capsular incision was made on the medial aspect of the 1st MTP joint.

Removal of the bunion was carried out to sagittal sulcus of the medial side of the first metatarsal head using an oscillating saw.
A hole was drilled in the center of the metatarsal head to mark the apex of the osteotomy.

The chevron osteotomy was cut at approximately 60˚ angle using an oscillating saw. The osteotomy was finished with a chisel.
Figure 7  The osteotomy cutting.

Capital fragment was displaced approximately 5 mm laterally.

Figure 8  Displacement of the capital fragment.

The osteotomy was temporarily fixed to the displaced position with a 1.25 mm Kirschner wire. Fixation of the osteotomy was made using an ActivaPin™ 2.0 x 40 mm. The hole for the implant was drilled with a 2.0 mm Kirschner wire.
Figure 9  Left: Temporary fixation with a 1.25 mm Kirschner wire and drilling a hole for the ActivaNail™ with a 2.0 mm Kirschner wire. Right: ActivaPin™ 2.0 x 40 mm with the applicator.

The medial flare was shaved with an oscillating saw.

Figure 10  Removal of the medial flare.

Soft tissue manipulation was finished by tightening of the medial capsular tissue using 1-0 absorbable sutures to gain a neutral position for the toe.
Weil osteotomy was made to second metatarsal head in order to decompress the second MTP joint. The procedure was carried out through the incision made in the web space between the first and second metatarsal.
Temporary fixation of the osteotomy was made with 0.8 mm Kirschner wire. The actual fixation was made with one ActivaNail™ 2.0 x 15 mm. The hole for the ActivaNail™ was drilled with 2.0 mm Kirschner wire. The nail was tapped into the drill hole while supporting the second metatarsal from the plantar side. Both incisions were closed in layers.

As a postoperative care metatarsal heads were firmly bound together with a bandage. Note that dressing was wrapped in counterclockwise direction in order to support the corrected first ray position.
Figure 15  Left: Dressing is applied between the toes to support the corrected first ray position. Right: post operative dressing wrapped counterclockwise to best support for the new position of the first ray.

Postoperative immobilization regimen of 6 weeks with a hallux valgus shoe was instructed. Weight bearing was allowed with a natural limitation by pain. Sutures were removed after healing of the wound.
3 Results

Stable osteotomies were seen in the fluoroscopy picture as well as hallux valgus correction of the MTP I joint and decompressed MTP II joint. Hallux valgus angle (HVA) was 23˚ and Intermetatarsal angle (IMA) 13˚.

![Image of X-ray showing HVA and IMA angles.]

Figure 16 Postoperative control X-ray at 6 weeks.

On the clinical control visit at 6 weeks the foot was found to be good both subjectively and objectively measured, but redness and slight swelling of the operation area was noted. Due to patient's medical history (spondyloarthropathy with cortisone medication) staphylococcal infection (erysipelas) was suspected and cephalosporine antibiotic was started (750mg x2/day). At 8 weeks control in clinical examination it was noted that the redness had almost completely disappeared but some swelling still persisted. Support socks were described to help resolving the swelling of the feet. At 8 weeks there was still some pain on the medial side of the first metatarsal, but that is expected be resolved in cause of time.
4 Discussion

ActivaPin™ and ActivaNail™ are well suitable for fixation of chevron, weil and many other osteotomies in foot surgery. Grooved surface of these implants adds rotational stability, which is beneficial when osteotomies are fixed with a single fixation device. The strength and biomechanical performance of these products widens the applicability into more demanding indications than typically found suitable for bioabsorbable pins.

Comparing to metallic fixation devices the benefits of these products to the patient are clear. The grooved of ActivaPin™ and ActivaNail™ surface offers a new type of stabilization in the osteotomies. The ability to modify the implant during the surgery yields more anatomical end result. Due to the bioabsorbability the patient does not need to undergo a second surgery for hardware removal and long term complications to the implant material are avoided.

In our clinical practice we have not encountered clinically noticeable adverse tissue reactions while using Activa –products.
5 Contact info

• Information concerning the case:

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Clinical Application of PLGA Resorbable Screw Fixation in Forefoot Surgery

Charles M Zelen, DPM FACFAS¹, David L Nielson, DPM²,

Bioresorbable fixation has been utilized for over 25 years in the fixation of osteotomies in the foot and ankle. One of the most common indications today for the use of bioresorbable fixation is for first ray surgery. Multiple studies have shown the effectiveness of resorbable fixation in bunion surgery including Hirvensalo, et al in 1988 who described the use of Poly-glycolic Acid (PGA) pins in Chevron osteotomies (1,2) and Brunetti et al in 1991 where he described the use of Poly-Paradaxone (PDS) pins for the same osteotomies (3). The trouble that developed with pure PGA or PDS fixation was that swift resorption of the polymer and dyes led to complications that included inflammatory reactions as well as osteolysis. These events were most common in the pure PGA implants (4-10).

The development of pure Poly-Lactic Acid (PLLA) fixation including pins and screws showed greater promise with a number of studies showing minimal osteolysis and foreign body reactions (11-12). The dilemma with the pure PLLA implants is the very long absorption time of up to 5 years (12,14, 15).

Newer implants combining Poly-Lactic Acid and Poly-Glycolic Acid known as PLGA implants, have great promise for offering strength equal to the pure PLLA fixation but with a quicker resorbtion time that is controlled over a period of 18 months while still having a minimal incidence of inflammatory reactions (16-27).

The RFS Screw which is a mixture of 85% Poly-Lactic Acid and 15% Poly-Glycolic Acid gives a high mechanical and shear strength (Figure one), as well as stiffness, while delivering reliable resorbtion characteristics. In addition, the screw offers a torque limiting AO compatible insertion driver for ease of insertion, and once the driver is removed a low profile screw head is exposed. This low profile head provides for minimal soft tissue prominence (Figure two).

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Financial Disclosure: This Clinical Case Study is Sponsored by Tornier
Case Study

A 40 year old health care worker with a long standing bunion deformity failing conservative care for many years, elected for a bunionectomy. After careful consideration and even a search of the literature the patient decided on resorbable fixation as her fixation of choice for the procedure.

The patient underwent a long arm chevron bunionectomy with a hallux osteotomy. The patient spent two weeks in a splint and then transitioned to a cam-walker and returned to work at the hospital weightbearing in the cam walker. After six weeks she went into tennis shoes, then returned to full activity shortly after and returned to her exercise regimen by week 12. The patient had no incidence of any type of inflammatory soft tissue reaction, nor was there any osteolysis seen on x-ray on long term follow up(Figure Three-Seven)
Intraoperative photograph of Long Arm Chevron Osteotomy (A) and (B). Depict a Long Arm Chevron after moving the capital fragment for correction and temporary fixation with a kirschner wire.

Intra-Operative photographs of insertion of PLGA RFS screw (A) and (B) This photo depicts compatible hexagonal torque limiting head for ease of screw insertion. The removable metallic head is then detached when satisfactory screw purchase is achieved and be replaced back on PLGA screw for further screw tightening as needed by surgeon.
Figure Five (A&B)

Intra-Operative photographs of PLGA screws after insertion. (A) and (B) depicts the resorbable screw with firm purchase in the underlying long arm chevron, with very low profile head for minimal soft tissue prominence.

Figure Six (A&B)

Intra-Operative photographs of PLGA screws after insertion. (A) and (B) depicts the resorbable screw with firm purchase in the underlying phalanx osteotomy which was also performed again note very low profile head for minimal soft tissue prominence.
X-Rays Pre-Operative and Post-Operative (A) depicts x-rays of patient prior to bunionectomy with double osteotomy (B) depicts long term post-operative x-ray after bunionectomy with long arm chevron and hallux osteotomy, note good bone healing and lack of osteolysis around screws

Conclusion
Resorbable screws are an excellent option for fixation in bunion surgery. Although there are many absorbable materials available for implantation, a combination of Poly-Lactic Acid and Poly-Glycolic Acid may be the best option combining strength and controlled resorption. A long term IRB approved prospective study looking at the RFS screw in bunion surgery is currently underway to help further elucidate the safety of this implant.
References


References

27. A Ignatius, L Claes; In vitro biocompatibility of bioresorbable polymers: poly(L,DL-lactide) and poly(L-lactide-co-glycolide; Biomaterials 17 (1996) 831