

Platelet-rich plasma for the treatment of coccydynia: a case report and review of regenerative medicine for coccydynia

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Aim: To describe the successful treatment of coccydynia using ultrasound-guided injection of platelet-rich plasma. **Setting:** Outpatient orthopedic practice. **Patient:** 17-year-old female with BMI of 42.6. **Case description:** The patient presented with 6 months of nontraumatic coccygeal pain exacerbated by sitting. Physical exam was significant for point-tenderness over the sacral hiatus and coccyx. A corticosteroid injection around the sacrococcygeal ligament was administered with immediate resolution of her pain following the injection with the anesthetic. The patient reported significant pain relief for 1 week. The superficial sacrococcygeal ligament was then treated with a platelet-rich plasma injection under US guidance. **Results:** The patient reported a 70% improvement in pain and sitting tolerance at 6 weeks. By 6 months post injection, her pain was 100% resolved, and she remained pain free at the 12-month follow-up. **Conclusion:** Platelet-rich plasma may be considered as a treatment option in patients with refractory coccydynia.

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Keywords: coccydynia • platelet-rich plasma • regenerative medicine • ultrasound guided injection

Coccydynia is localized pain over the coccyx. Patients typically report pain with prolonged sitting and rising from a seated position [1,2]. Coccygeal pain can be traumatic or nontraumatic. No universally accepted treatment protocol exists, but 90% of cases respond to conservative management [3]. In refractory cases, interventional procedures have been used, including injections around the coccyx at the sacrococcygeal junction and ligaments, epidural steroid injections [4], and ganglion impar block or radiofrequency ablation [3,5]. Surgical excision of the coccyx is considered only after all other treatment options have failed. Coccygectomy can offer satisfactory relief of pain [6], but has been associated with a high incidence of complications with wound infections in up to 22% of cases [2].

In the last decade, the use of regenerative medicine has become more common in the treatment of orthopedic and spine disorders [1,7,8]. Platelet-rich plasma (PRP) injections have been used for painful ligamentous laxity, including chronic syndesmotic injuries in the ankle, medial collateral ligament injuries in the knee, and ulnar collateral ligament injuries in the elbow [9]. While pathologic laxity of the sacrococcygeal ligament is one proposed cause of coccydynia [10], the literature on regenerative injections for coccydynia is limited. Here, the authors present a case of PRP used to treat refractory coccydynia and a review of the literature.

Case report

A 17-year-old female with a BMI of 42.6 (5'2", 224 lb) presented with 6 months of coccygeal pain. She denied any inciting trauma or recent change in weight. Radiographs of the lumbar spine showed mild L5-S1 spondylosis. The pain was exacerbated by sitting and was refractory to 8 weeks of physical therapy. MRI showed an annular tear at L5-S1 without abnormalities of the sacrum or coccyx. The patient was instructed to continue with her home exercise program of reverse Kegels, core strengthening, and lumbar stabilization. She was also counseled on weight loss and to avoid sitting on hard surfaces. After 8 months, the patient continued to have focal pain over the coccyx.

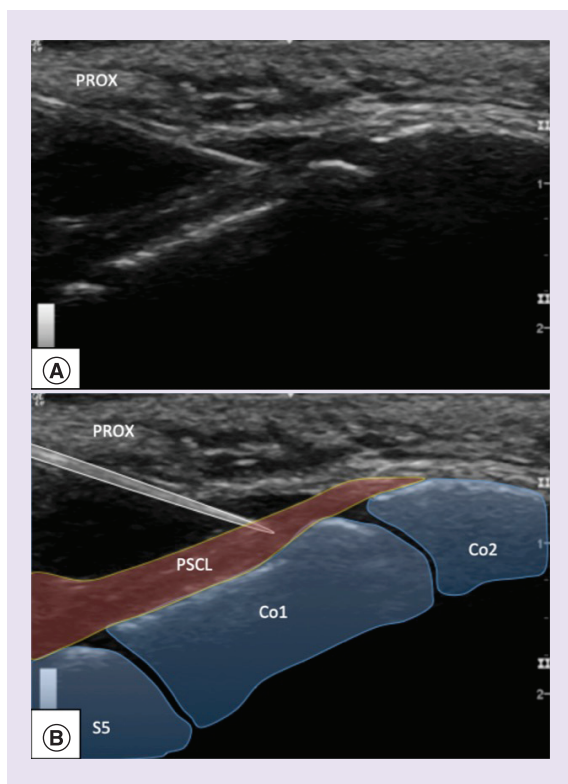


Figure 1. A companion case to illustrate the treatment of coccydynia via ultrasound-guided platelet-rich plasma injection. (A) Ultrasound-guided injection of the posterior sacrococcygeal ligament in long axis. (B) Image in A with overlying illustration to clarify anatomical structures.

Co1: 1st coccygeal segment; Co2: 2nd coccygeal segment; PROX: Proximal; PSCL: Posterior sacrococcygeal ligament; S5: 5th sacral segment.

A diagnostic and therapeutic injection of dexamethasone (4 mg) and lidocaine 1% (2 ml) was administered under ultrasound guidance to the sacrococcygeal ligament. The patient reported an immediate resolution of her pain when sitting, improving from a 7 to a 0 on the numeric rating scale.

At the 2-week follow-up, the pain had returned to baseline and the patient underwent a trial of a PRP injection into the sacrococcygeal ligament. Prior to injection, written informed consent outlining the risks and benefits of the procedure was obtained from the patient. Thirty milliliters of whole blood was processed with an EmCyte Pure-PRP system (EmCyte Corporation, FL, USA) to produce 3 ml of leukocyte poor PRP. After sterile preparation and local anesthesia of the peri-ligamentous soft tissue, PRP was delivered directly into the posterior sacrococcygeal tendon under ultrasound guidance (GE Logiq E, 12L-RS Linear Array Transducer, 5-13 MHz) via a 25-gauge 2-inch needle (Figure 1). Nonsteroidal anti-inflammatory medications were limited 1 week before and 2 weeks after the procedure. Tramadol was used for post-procedural pain. At the 6-week follow-up, the patient reported 70% pain relief, and had total resolution of pain with usual activity and sitting on cushioned surfaces. She continued to have pain when sitting on hard surfaces, but the pain was less severe. At 6-months post injection, her coccydynia had completely resolved, and she reported her pain was a 0 on the numeric rating scale. At the 12-month follow-up she remained pain free.

Discussion

The location of the coccyx makes it susceptible to trauma and patients can report acute or antecedent events resulting in pathologic laxity. Ligamentous laxity of the first intercoccygeal joint is one proposed mechanism of coccydynia, as the second intercoccygeal joint is generally fused [11]. Use of prolotherapy and PRP injections has been reported for painful hypermobility and ligamentous laxity throughout the body. Indeed, regenerative injections for the treatment of recalcitrant coccydynia were first reported in 1956 using prolotherapy [12]. Despite this early interest in regenerative injections for coccydynia, the literature remains limited (Table 1).

Advances in the understanding the degenerative nature of chronic tendon and ligament injuries have increased the interest in regenerative medicine injections. PRP for the treatment of coccydynia was recently reported by Montero-Cruz and Aydin, who demonstrated decreased pain in three subjects after a fluoroscopic-guided PRP injection into the deep and superficial sacrococcygeal ligaments [1]. While encouraging, fluoroscopy has limitations.

Table 1. Regenerative medicine for coccydynia – summary of the literature.

Study (year)	Study design	Subjects (n)	Image-guidance	Treatment	Ref.
Hack <i>et al.</i> (1956)	Case report	1	LMGI	Prolotherapy (zinc sulfate-phenol and Synlasol solution); series of three injections	[11]
Khan <i>et al.</i> (2008)	Case series	37	“image intensifier”	Prolotherapy (dextrose 25%); single injection	[12]
Chen <i>et al.</i> (2013)	Case series	3	Ultrasound	Prolotherapy (dextrose 50%); single injection	[13]
Montero-Cruz <i>et al.</i> (2018)	Case series	3	Fluoroscopy	PRP; single injection (1 subject had a 2nd injection)	[1]

Regenerative medicine for coccydynia summary of the literature.
LMGI: Landmark guided injection; PRP: Platelet-rich plasma.

PRP injections are typically not covered by insurance and access to fluoroscopy in a surgical center can be cost prohibitive. Ultrasound guided injections in a clinic setting reduces these additional costs.

In the case presented here, the patient responded to a PRP treatment of the superficial sacrococcygeal fibers along the posterior aspect of the coccyx. Ultrasound allows direct visualization of the superficial ligaments, but the deep sacrococcygeal fibers are obscured by the coccyx. Despite treating only the superficial sacrococcygeal ligaments, this case demonstrates the effective use of ultrasound-guided PRP injection for refractory coccydynia. The results of this case report are encouraging, but large studies with long-term follow-up are required to establish PRP as the treatment of choice in cases of refractory coccydynia due to ligamentous laxity.

Conclusion

Ligamentous laxity of the sacrococcygeal ligament is one proposed mechanism of coccydynia. PRP injections have been used to treat painful hypermobility and ligamentous laxity throughout the body. In this case, a PRP injection of the superficial sacrococcygeal ligament was effective in treating coccydynia refractory to conservative management and should be considered as a treatment option in patients who fail conservative management. In addition, ultrasound allowed for direct visualization of the superficial ligaments.

Summary points

- The location of the coccyx makes it susceptible to trauma and patients can report acute or antecedent events resulting in pathologic laxity.
- Ligamentous laxity of the sacrococcygeal ligament is one proposed mechanism underlying coccydynia, and cases refractory to conservative management can be challenging to treat.
- In this case, a platelet-rich plasma injection of the superficial sacrococcygeal ligament was effective in treating coccydynia refractory to conservative management.
- Platelet-rich plasma should be considered as a treatment option in patients who fail conservative management. Ultrasound allows direct visualization of the superficial ligaments.

Financial & competing interests disclosure

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.

Ethical conduct of research

The authors state that they have obtained verbal and written informed consent from the patient/patients for the inclusion of their medical and treatment history within this case report.

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