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COCCYDINIA: PAIN MANAGEMENT WITH RADIOFREQUANCY THERMOABLATION OF GANGLION IMPAR

KOKSİDİNİ: İMPAR GANGLİONUNUN RADIOFREKANS TERMOABLASYONU İLE AĞRI TEDAVİSİ

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ABSTRACT:

Introduction: Coccydynia is a rare but painful condition that affects the coccygeal region. The incidence is not well known but obesity and female gender are increased risk factors for developing. The management is complicated for the clinicians due to unknown etiology with no universally accepted treatment. Our aim is to evaluate the results of radiofrequency thermoablation (RFT) of ganglion impar treatment for coccydynia.

Materials-Methods: We conducted a prospective, cross sectional study including 42 patient who suffers from coccydinia. Visual Analog Scale (VAS) and Oswestry Low Back Pain Disability Questionnaire (Oswestry) score were used to determine the progression of pain under treatment.

Results: The study included 42 patients with coccydynia. Of these 15 (% 35.7) were male and 27 (% 64,3) were female. The average body mass index(BMI) is 28,6 kg/m2 and weight 78,1kg. Men were significantly taller and heavier than women but there is no statistically difference in age, BMI, duration of pain. After six months follow-up VAS was dramatically decreased but in the first year examination, minimally increased again. Oswestry and VAS had a correlation in one year follow-up.

Conclusion: Treatment with RFA has a better clinical outcome supported with or without medical treatment when compared with medical treatment alone.

Key words: Coccydynia, Radiofrequency thermoablation, Coccydynia pain management

Level of evidence: Prospective clinical stuıdy, Level II

ÖZET:

Giriş: Koksidini koksigeal bölgeyi etkileyen nadir fakat ağrılı bir durumdur. Insidansı çok iyi bilinmemekle birlikte kadın cinsiyet ve obezitenin koksidini gelişme riskini arttırdığı bilinmektedir. Etyolojisi tam olarak bilinmeyen bu ağrılı durumun tedavisinde de hekimler icin evrensel bir tedavi protokolu bulunmamaktadır. Çalışmamızın amacı koksidini tedavisinde impar gangliyonunun radyofrekans termoablasyonu (RFT) sonuçlarını incelemektir.

Materyal-Metot: Koksidini tanısı almış 42 hastanın prospektif kesitsel çalışması yürütüldü. Tedaviyi değerlendirebilmek için Visual Analog Scale(VAS) ve Oswestry Low Back Pain Disability Questionnaire (Oswestry) testleri kullanıldı.

Bulgular: Çalışmaya koksidini tanısı almış 42 hasta dahil edildi. Bunların 15 (% 35,7) erkek, 17(% 64,3) kadındı. Ortalama vücut kitle indeksi (BMI) 28,6 kg/m2 ve ağırlık 78,1 kg idi. Erkeklerin BMI kadınlardan yüksek olmasına rağmen yaş, cinsiyet ve ağrı arasında istatistiksel bir fark bulunmadı. RFT işlemi sonrası 6 aya kadar takiplerde VAS skorunda istatistiksel anlamlı azalma gözlendi. Birinci yıl sonunda VAS skorunda minimal bir artış olmasına rağmen istatistiksel olarak anlamlı değildi. Oswestry ve VAS takibinde bir yıl sonunda korelasyon mevcuttu.

Sonuç: RFT kullanımı ilaç destekli veya desteksiz olarak koksidini tedavisinde tek başına medikal tedaviden daha iyi sonuçlar vermektedir.

Anahtar kelimeler: Koksidini, Radyofrekans termoablasyon, Koksidini ağrı yönetimi

Kanıt düzeyi: Prospektif klinik çalışma, Düzey II

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INTRODUCTION:

Coccydynia is a painful situation that will be difficult to treat and the etiologies are hard to elucidate. It was first described in 1726 as pathologic entity in the region of the coccyx. Coccydynia mainly affects women and often related to trauma, obesity, pregnancy, child birth, cancer, degenerative and idiopathic[3,11,12]. Some authors attribute this to more posterior anatomical location of sacrum and coccyx[13]. Coccydynia was associated with some psychiatric problems such as depression and hysteria in 80s[7].

The classic presentation of coccydynia is localized pain over the coccyx. Patients present complaining of "tailbone pain". The pain will usually be worse with prolonged sitting, leaning back while seated, prolonged standing and rising from a seated position[4]. Pain may also be present with sexual intercourse or defecation.

Most cases of coccydynia resolve within weeks with conservative treatment but for a few patient the pain can become chronic. There is debate over the optimal treatment for patients with chronic coccydynia[9]. Nonsurgical strategies consisting of medications such as non-steroidal anti-inflammatory agents (NSAIDs), analgesics, steroid injections, coccyx manipulations, reduced sitting, donut pillow use, postural adjustments and physical therapy[9].

Destruction of ganglion impar using radiofrequency thermoablation (RFT) is another therapeutic option. RFT is a percutaneous minimally invasive procedure. Ganglion impar has been blocked in the relief of many chronic pain syndromes originating from pelvic structures such as the coccyx. Procedure involves an electrical circuit consisting of an active electrode, tissues near the tip of the active electrode and a dispersive electrode.

The purpose of our study was to evaluate the effect of RFT of ganglion impar for chronic coccydynia patients who were not cured with conservative and medical treatments[5,8].

MATERIAL AND METHODS:

The study included 42 patients with coccydynia. Of these 35.7 % were male and 64,3 % were female. The average body mass index (BMI) is 28,6 kg/m^2 and weight 78,1kg. All 42 patients treated with RFT procedure. Nineteen patients treated with only RFT, 11 patients treated RFT+NSAIDs, twelve patients treated RFT+NSAIDs+Gabapentin (GP). All patients signed an informed consent.

All procedures were performed on the fluoroscopy table. 22G 10mm active-tip radiofrequency needles were used at 50Hz with 0,9V. Before procedures all of the patients did not respond with NSAIDs, GP, donut seat pillows and other conservative methods. Patients with radicular symptoms and rectal, gynecologic disorders were excluded.

Pre-procedure Visual Analog Scale (VAS) and Oswestry Low Back Pain Disability Questionaire (Oswestry) and post-procedure 1.,3.,6. and 12. month follow-up were documented. Data from 42 patients was used in the analysis. The covariates used were age, gender, length, weight, BMI, chronic pain period (Table-1).

Table-1. Demographics variables of all group

		n	%					
Gender	Male	15	35,7					
	Female	27	64,3					
		All		Male		Female		
		Mean	SD	Mean	SD	Mean	SD	p
Age (year)		65,3	7,5	67,3	5,7	64,1	8,2	,192
Length (cm)		165,4	8,6	172,1	7,1	161,6	7,1	<0,001
Weight(kg)		78,1	8,8	85,0	7,7	74,3	6,8	<0,001
BMI (kg/m^2)		28,6	2,3	28,7	2,6	28,5	2,3	,736
Period(month)		16,9	7,8	17,6	7,7	16,5	7,9	,671

Statistical Analysis:

For more than two groups for comparison of independent groups Kruskal-Wallis non-parametric variance analysis, the Mann-Whitney U test was used for both groups. Dependent group comparisons for more than two groups in the Friedman test, Wilcoxon test was administered to both groups. For statistically significant differences detected in more than two group comparisons were made post-hoc analysis, the

Wilcoxon the groups dependent on this analysis, the Mann-Whitney U test was used for independent samples. Pairwise comparisons based on the number of post-hoc analysis of Bonferroni correction was applied. The relationship between VAS scores and Oswestry scale study was carried out with the Spearmanno-parametric correlation analysis. Type-1 margin of error for all the main groups except for analysis post-hoc analysis was adopted as 5 %. Analysis in SPSS 21 (IBM, Inc., USA) software is used.

RESULTS:

All patients fully completed follow-up visits for one year. VAS baseline (pre-procedure) measurements of the patients, first, third, 6th and 12th months evaluated and the results obtained are presented in Table-2.

In comparisons made based on the change of VAS scores during visits. In post-hoc analysis (Table-3) significant changes that cause initial VAS values of the group, while the assessed VAS scores at follow-up was determined that it remained significantly lower compared to baseline.

In addition, VAS values higher than 3th months, 1th month, 12th month values were higher than the 3th and 6th months. Change of VAS score over time is presented graphically in Figure-1.

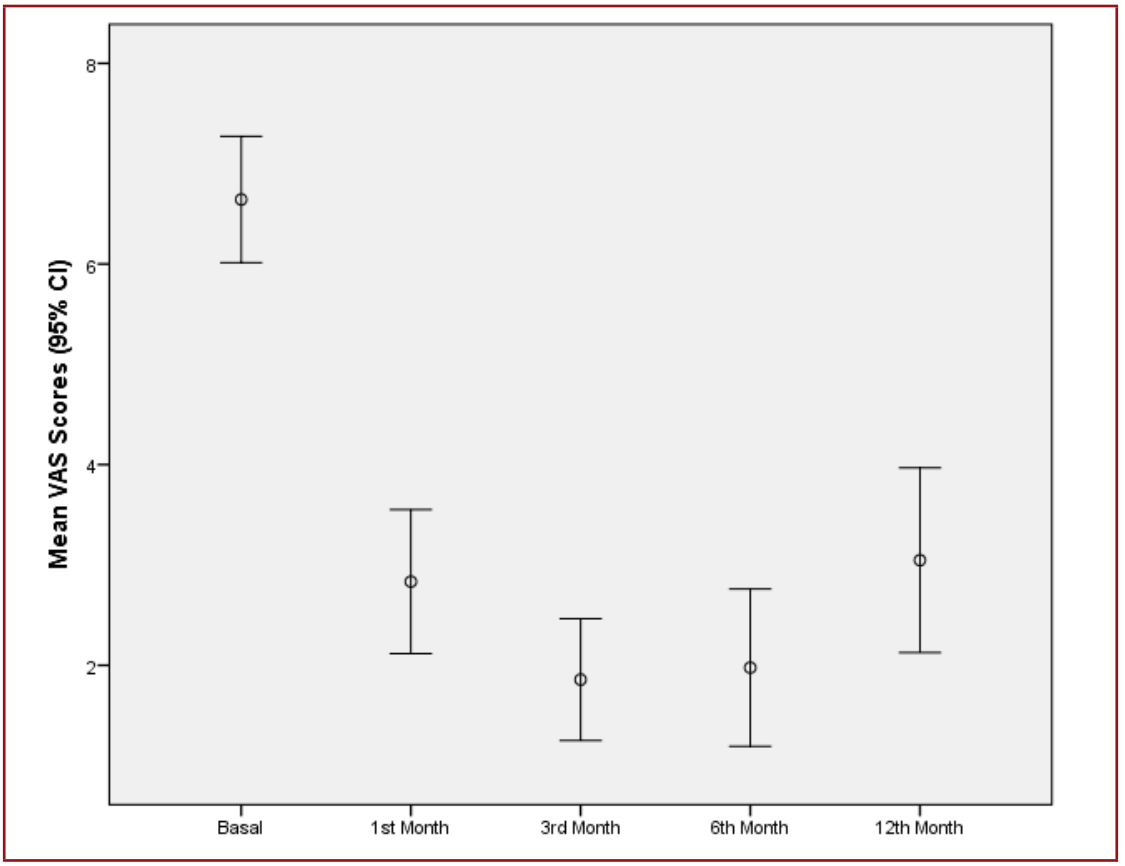

Figure-1. Change of VAS score over time

Table-2. Periodic changes of VAS

VAS	Mean	SD	median	25 percentil	75 percentil	p
0 (Pre-procedure)	6,64	2,02	6,00	5,00	8,00	
1. month	2,83	2,30	2,50	0,00	5,00	
3. month	1,86	1,95	2,00	0,00	2,00	<0,001
6.month	1,98	2,51	2,00	0,00	3,00	
12. month	3,05	2,95	2,00	0,00	4,00	

Table-3. Post-hoc significant analyses for VAS

	0-1. month	0-3. month	0-6. month	0-12. month	1-3. month	1-6. month	1-12. month	3-6. month	3-1. month	6-12. month
p	<0,001	<0,001	<0,001	<0,001	0,003	0,061	0,712	0,64	0,005	<0,001

VAS scores made to assess whether men and women differ between gender comparisons are presented in Table-3. According to the analysis measured at baseline and during follow-up VAS values of the patients according to sex it has been found to show a difference.

The study on the evaluation made by the treatment at baseline (p = 0.015), 3th months (p = 0.006), 6th months (p = 0.001) and in 12th months (p <0.001) RFT+NSAIDs+GP, RFT+NSAIDs and RFT has been found to show statistically significant difference between patients' VAS (Table-5).

P values for the post-hoc analysis are summarized in Table-6.

Scores change over time in the Oswestry scale are also summarized in Table-7.

Initial assessment, first, third, 6th and 12th month compared and by time changes in a statistically significant change observed in the form of a reduction as a trend over time for this change to occur, but only 6th and 12th month measurements have been found to differ significantly (Figure-2).

Table-4. VAS scores differ between gender comparisons

	Gender				
VAS	Male		Female		
	Mean	SD	Mean	SD	p
0 (Pre-procedure)	6,87	2,17	6,52	1,97	0,680
1. month	3,2	2,48	2,63	2,22	0,495
3. month	2,07	2,22	1,74	1,81	0,749
6. month	2,47	3,09	1,7	2,15	0,584
12. month	3,2	3,03	2,96	2,97	0,767

Table-5. Comparison of procedures

VAS	Procedure						
	RFT+NSAIDs + GP		RFT+NSAIDs		RFT		
	Mean	SD	Mean	SD	Mean	SD	p
O (pre-procedure)	6,00	1,41	6,91	1,81	6,13	2,13	0,015
1. month	3,00	2,41	2,09	1,87	2,73	2,60	0,258
3. month	1,67	1,72	1,18	1,83	1,47	1,19	0,006
6. month	2,50	2,32	1,45	1,57	0,53	0,92	0,001
12. month	4,25	2,53	2,00	1,55	1,27	1,71	<0,001

Table-6. P values for the post-hoc analysis

	0 (pre-procedure)	3. month	6. month	12. month
[RFT+NSAIDs+GP] - [RFT+NSAIDs]	0,196	0,401	0,273	0,025
[RFT+NSAIDs+GP] - RFT	0,98	0,831	0,013	0,003
[RFT+NSAIDs] - RFT	0,293	0,346	0,103	0,232

Table-7. Oswestry results of follow-up

Oswestry	mean	SD	median	25 percentil	75 percentil	p
0 (pre-procedure)	37,38	18,89	39,00	17,00	53,00	
1. month	27,98	15,00	30,00	14,00	35,00	
3. month	20,67	13,35	19,00	10,00	29,00	<0,001
6. month	15,48	11,85	11,50	7,00	19,00	
12. month	14,95	15,81	10,00	5,00	16,00	

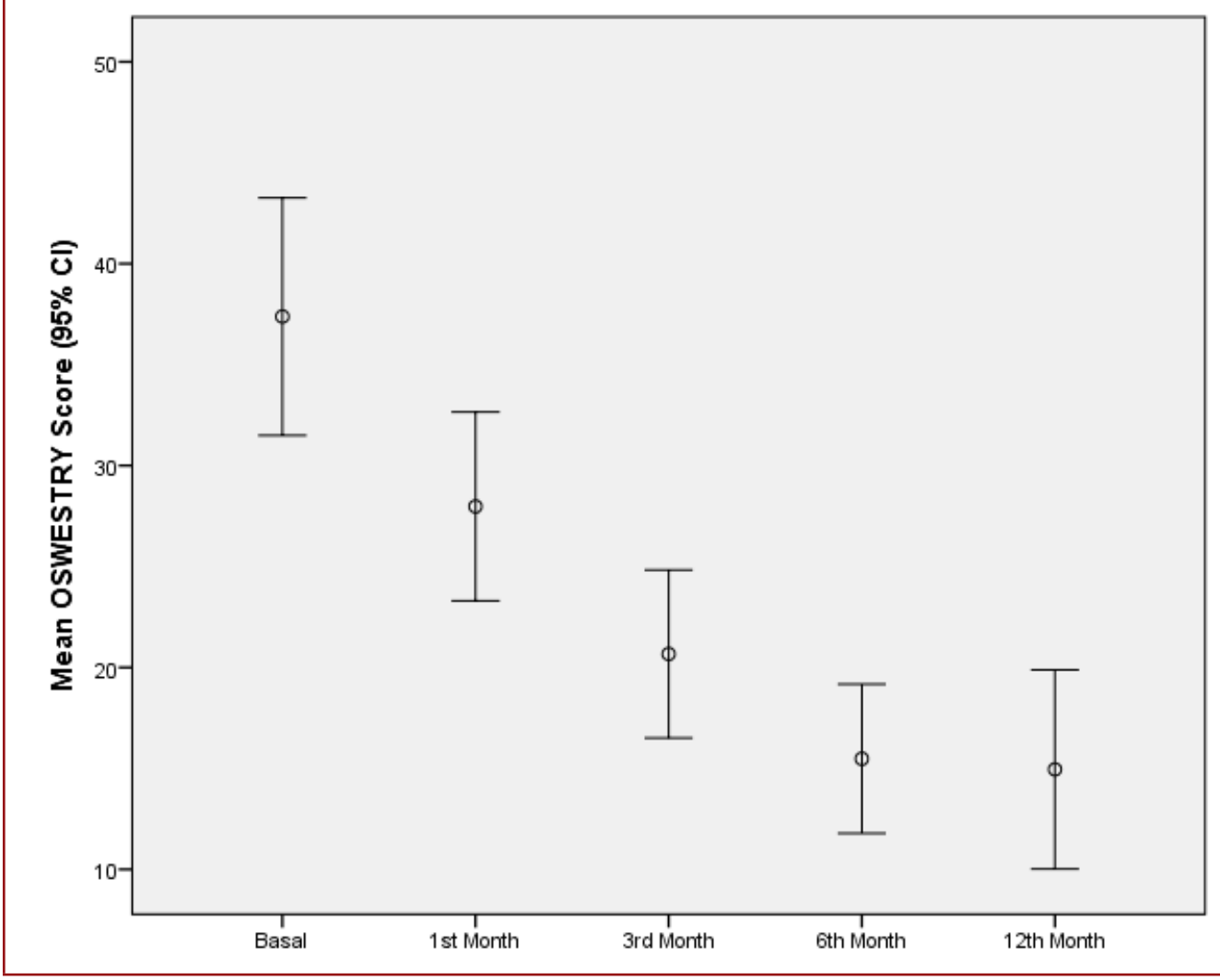

Figure-2. Change of Oswestry score over time

The measurement results obtained with Oswestry scale compared between male and female patients are summarized in Table-8. There is no statistically difference in gender for Oswestry score change in time.

By comparing the treatment scores obtained with Oswestry scale by drugs. It has been found to differ between groups of the values obtained at all measurement points (Table-9).

Post-hoc analysis are summarized in Table-10, substantially surgery was found to be significantly higher than the score of the patients.

Correlation of Oswestry and VAS scores assessed in this study are summarized in Table-11.

According to the analysis of only Oswestry in the initial assessment and VAS scores were correlated statistically, first month measurements of mild ($r = 0.323$; $p = 0.037$), third months measurement of mild-to-moderate ($r = 0.476$; $p = 0.001$), 6th months measurement of medium-strong degree ($r = 0.643$; $p < 0.001$) and 12th months if the measure strong degree ($r = 0.709$; $p < 0.001$) and all the correlations were positive (the rising of Oswestry scores in parallel with the increase in VAS scores).

When the results are evaluated it is clear that RFT procedure is beneficial for the treatment of chronic pain of coccydynia. Only 4 of 42 patients have gone for surgery. All 38 patients benefit from RFT procedures with or without NSAIDs and GP, however they have not been cured with only medical and conservative treatment modalities.

Table-8. Oswestry results according to gender

Oswestry	Gender				
	Male		Female	SD	p
	Mean	SD	Mean		
0 (pre-procedure)	34,33	21,65	39,07	17,38	0,365
1. month	25,47	18,51	29,37	12,83	0,232
3. month	20,47	17,1	20,78	11,11	0,470
6. month	15,07	13,08	15,7	11,36	0,703
12. month	14,67	18,88	15,11	14,21	0,422

Table-9. Oswestry results

Procedure							
Oswestry	**RFT+NSAIDs+GP**		**RFT+NSAIDs**		**RFT**		**p**
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	
0 (pre-procedure)	32,58	21,26	29,73	16,76	40,60	14,58	0,032
1. month	24,00	14,96	22,73	13,76	28,93	10,78	0,037
3. month	18,92	12,76	13,64	9,16	20,60	8,45	0,010
6. month	15,42	12,41	9,45	5,16	13,07	6,47	0,008
12. month	13,58	15,06	8,18	5,40	10,87	5,28	0,010

Table-10. Post-hoc analysis

	0 (pre-procedure)	**1. month**	**3. month**	**6. month**	**12. month**
[RFT+NSAIDs+GP] - [RFT+NSAIDs]	0,622	0,758	0,355	0,308	0,664
[RFT+NSAIDs+GP] - RFT	0,232	0,271	0,464	0,941	0,509
[RFT+NSAIDs] - RFT	0,102	0,169	0,04	0,131	0,221

Table-11. The correlation between VAS scores and Oswestry scale

	Oswestry 0 (pre-procedure)	Oswestry 1. month	Oswestry 3. month	Oswestry 6. month	Oswestry 12. month
	r (p)	r (p)	r (p)	r (p)	r (p)
VAS 0 (pre-procedure)	0,124 (0,435)	0,132 (0,403)	0,268 (0,086)	0,337 (0,029)	0,391 (0,01)
VAS 1. month	0,314 (0,043)	0,323 (0,037	0,305 (0,05)	0,243 (0,121)	0,188 (0,233)
VAS 3. month	0,325 (0,035)	0,389 (0,011)	0,476 (0,001)	0,526 (<0,001)	0,536 (<0,001)
VAS 6. month	0,268 (0,086)	0,323 (0,037	0,461 (0,002)	0,643 (<0,001)	0,676 (<0,001)
VAS 12. month	0,156 (0,323)	0,201 (0,202)	0,388 (0,001)	0,59 (<0,001)	0,709 (<0,001)

DISCUSSION:

Coccydynia is a rare condition that is often self-limited and mild. Although it usually responds well to conservative treatment, some patients require more aggressive treatments[1]. Minimal invasive procedures and conservative methods such as analgesics, non-steroidal anti-inflammatory agents (NSAIDs), local anesthetics, steroid injections, coccyx manipulations, reduced sitting, donut pillow use, postural adjustments, physical therapy and nerve blockage techniques[9]. Coccygectomy may be indicated for patients who have failed conservative management.

A randomized open study showed that intra-rectal manipulation had a 25% success rate in treating chronic coccydynia[6]. Steroid injections under fluoroscopic guidance into the coccygeal joints have shown better efficacy with patients suffering from acute coccygeal pain.

RFT is a percutaneous minimally invasive procedure. Various RFT techniques have been used for intervertebral discogenic pain. The ganglion impar is the lowest ganglion of the paravertebral sympathetic chain, which is placed at the anterior aspect of the sacrococcygeal disc. It has been blocked in the relief of many chronic pain syndromes originating from pelvic structures such as the coccyx. RFT involves an electrical circuit consisting of an active electrode, tissues near the tip of the active electrode and a dispersive electrode. We performed at 50 Hz, and reproduction of pain at less than 0.9 V. There is no universal consensus.

There are few studies for the use of RFT of ganglion impar in the literature. Demirçay et al. aimed to evaluate the effectiveness of RFT of ganglion impar in patients with chronic coccydynia using the parameters of pain and health related quality of life and they reported success. Also Foye et al. and Reig et al. inspected the use of RFT of ganglion impar nerve blocks with some success[2,10] Our study results are supporting these studies.

Finally our results support that RFT of ganglion impar may provide beneficial pain relief in the treatment of chronic coccydynia. RFT is minimal invasive, simple to perform and relatively safe procedure that should be suggested in chronic coccydynia patients who are unresponsive to conservative treatment modalities.

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