

# Management of osteochondritis dissecans (OCD) of the elbow trochlea in the adolescent population: A systematic review

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## Abstract

**Background:** Elbow trochlea osteochondritis dissecans (OCD) is rare with limited information on it. The aim of this systematic review is to assess the published evidence on trochlea OCD in terms of presenting symptoms, location of OCD and outcome of management in adolescent patients.

**Patient & Methods:** A review of the online databases MEDLINE and Embase was conducted according to PRISMA guidelines. The review was registered prospectively in the PROSPERO database. Clinical studies reporting on any aspect of trochlea OCD management were eligible for inclusion and appraised using the Methodological Index for Non-Randomized Studies (MINORS) tool.

**Results:** 16 studies were eligible for inclusion with a total of 75 elbow. Mean age was 14 years (8–19) of which 46 were males. The main presenting symptoms were pain (95%). Non-operative care was reported in 86% of elbows with resolution of symptoms in 76%. Surgical management was described in 14%. There were equal number of arthroscopic and open procedures. 94% had successfully resolution of symptoms post-operatively.

**Conclusion:** Elbow trochlea OCD is a rare pathology and one that can be managed non-operatively in the majority of cases with good resolution of symptoms. However, if this fails, operative options are available with excellent results reported.

**Level of evidence:** Level IV, Systematic review.

## Keywords

elbow, trochlea, osteochondritis dissecans, OCD, pain, non-operative, overhead activities

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## Introduction

Osteochondritis dissecans (OCD) represents separation of an area of articular cartilage and underlying subchondral bone with sclerosis, fragmentation and resorption of differing degrees.<sup>1,2</sup> In the elbow, the lesion almost always occurs in the capitellum<sup>2,3</sup> although it can also affect the trochlea, radial head or olecranon fossa.<sup>4–6</sup> OCD is common in the adolescent group especially those with overuse and/or involved in overhead activities.<sup>7,8</sup>

OCD of trochlea is rare and is reported between 2.5%<sup>9</sup> to 7%<sup>10</sup> of all elbow OCD lesions. There is no clear underlying mechanism but a suggested contributing factor is the precarious blood supply to the posteroinferior aspect of the lateral trochlea.<sup>11,12</sup> An additional increase in the intraosseous pressure may also compromise the poorly perfused area of trochlea.<sup>11</sup> In an overhead athlete this blood supply can be further compromised from impingement

with repetitive elbow extension. It is possible to mistake the fragmentation of trochlear ossification centres as OCD.<sup>13</sup> Hence the age of the patient and location of the lesions is imperative in making the correct diagnosis.

The published literature regarding trochlea OCD is limited when compared to capitellum OCD, with no

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clear consensus on management.<sup>14</sup> The aim of this systematic review is to assess the published evidence on trochlea OCD in terms of presenting symptoms, location of OCD lesion and outcome of management in adolescent patients.

## Methods

A systematic review of the literature was conducted in accordance with the PRISMA guidelines using the online databases Medline and EMBASE. The review was registered prospectively on the PROSPERO database. The searches were performed independently by two authors on the 12 March 2021 and repeated on the 25 March 2021 to ensure accuracy. Any discrepancies were resolved through discussion between these two authors, with the senior author resolving any residual differences. The Medline and Embase search strategies are illustrated in Table 1.

Clinical studies reporting on cases of trochlea OCD in adolescent patients were included. Studies reporting on any aspect of trochlea OCD management were eligible for inclusion. Only primary research published in the English language was considered for review with any abstracts, comments, review articles and technique articles excluded.

The clinical studies were appraised independently by two authors and quality assessment of non-randomised studies was completed using the Methodological index for non-randomised studies (MINORS) tool [30]. MINORS is a validated scoring tool for non-randomised studies. Each of the 12 items in the MINORS criteria were given a score of 0, 1, or 2, with maximum scores of 16 and 24 for non-comparative and comparative studies, respectively.

## Statistical analysis

Chi-square analysis (with Fisher's exact test) was used to evaluate differences in categorical data between groups. A *p* value threshold of 0.05 was used for statistical significance. All statistical analyses were performed using Excel version 16.52 (Microsoft, USA).

**Table 1.** Search strategy.

PubMed	EMBASE
1. Humerus or humeral or elbow	(Humerus or humeral or elbow).mp
2. Trochlea	Trochlea.mp
3. Osteochondritis dissecans	Osteochondritis dissecans.mp
1 and 2 and 3	1 and 2 and 3
Results: 23	Results: 40

## Results

The initial search strategy generated 63 studies. After a review of titles, abstracts and references, 16 studies were eligible for inclusion; 2 non-randomised comparative case series, 6 case series and 8 case reports. The selection process is illustrated in a Preferred Reporting Items for Systematic Reviews and Meta Analyses flow chart (Figure 1). There were a total of 75 elbows in 70 patients with trochlea OCD. The mean age of patients was 14 years (8 to 19). There were 46 males and 24 females. The mean follow-up time was 16.3 months (5 to 50). The right elbow was affected in 67% (*n* = 50) of cases and the dominant side was involved in 73% (*n* = 48/66) of cases. When documented, patients were involved in overhead sports in 90% (*n* = 45/50) of cases with baseball pitchers being the most commonly (42% - *n* = 21/50) affected group. Study characteristics are summarised in Table 2.

## Radiological diagnosis

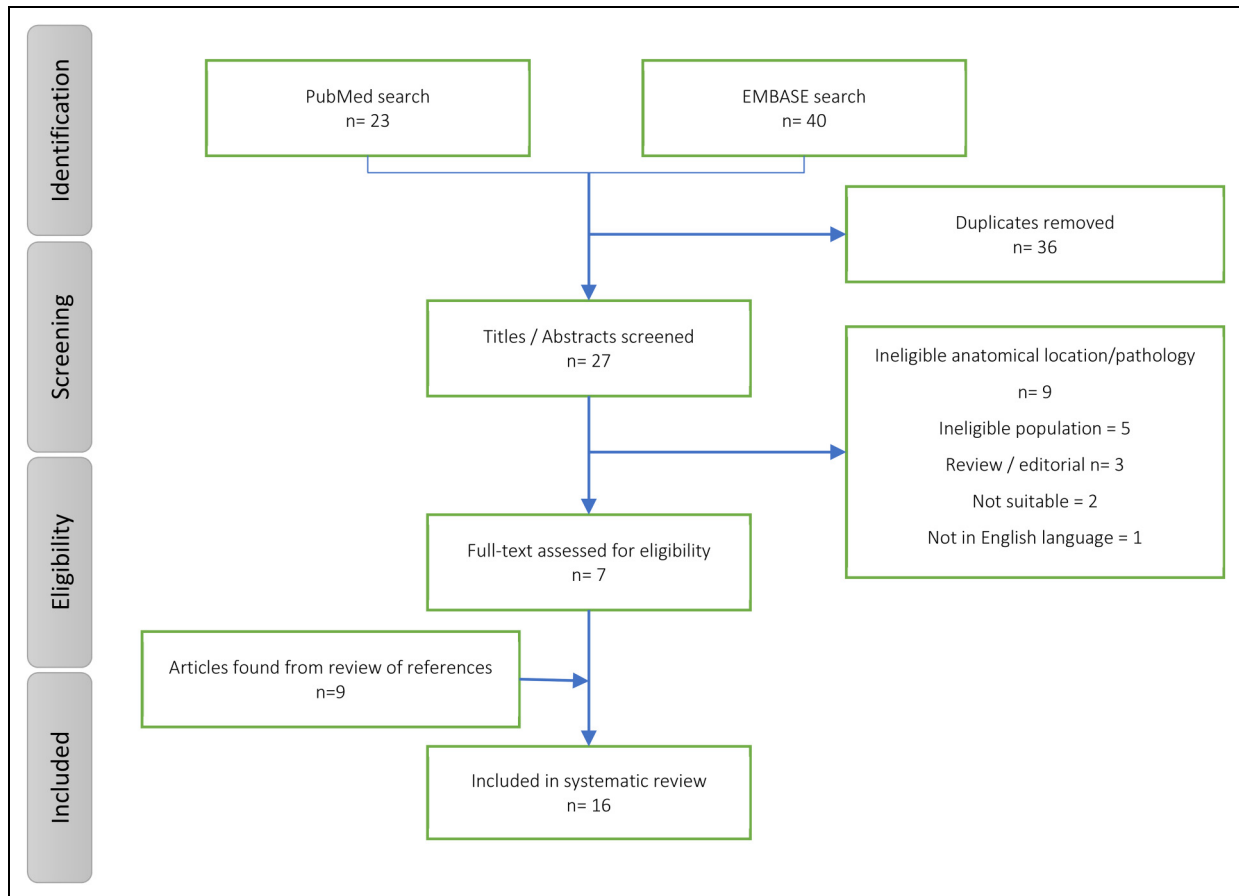
All 16 studies reported OCD diagnosis on radiographic findings (Table 3). Radiographic findings were described as radiolucent areas in 8 studies,<sup>15–22</sup> fragmentation in 3 studies<sup>23,24</sup> and lytic areas in 2 studies.<sup>5,25</sup> Three studies<sup>19,21,22</sup> stated radiographs were deemed normal initially but a retrospective review confirmed OCD. Fourteen studies carried out further MRI to confirm OCD but just 2 studies<sup>19,22</sup> commented OCD classification. Two studies<sup>23,24</sup> did not perform a MRI, one of which performed a CT scan of the elbow.<sup>24</sup> Overall, all the cases that had a CT showed the lesion clearly, whereas MRI was best for bone marrow oedema rather than precise geographical location.

## Site of lesion

A total of 74 out of 75 elbows had documentation of location of trochlea OCD. Only one study did not document the exact location of trochlea OCD. The commonest location was lateral trochlea in 77% (*n* = 57) of cases with medial trochlea found only in 23% (*n* = 17) of elbows. No case had any involvement of both medial or lateral trochlea at the same time.

## Non-operative treatment

Only one study did not report on surgical treatment modality,<sup>21</sup> with non-operative treatment described initially in 86% of elbows (63/73). Non-steroidal anti-inflammatory drugs, and/or activity modification and/or elbow immobilisation were described in four studies.<sup>15,19,25,26</sup> Two studies<sup>20,23</sup> did not specify what non-operative treatment entailed (Table 4). From the non-operative group 15 elbows (24%)<sup>11,18,22–24,27</sup> failed to improve and subsequently went on to have operative treatment between 5 months to 3.5 years.



**Figure 1.** Flow diagram of review process.

## Operative treatment

Ten elbows (14%) from 5 studies described operative treatment as the initial and only modality of management provided.<sup>5,16,17,20,28</sup> 15 (23.8%) elbows from the non-operative group subsequently underwent operative treatment (Tables 4 & 5). Overall, 25 (34%) elbows underwent operative treatment.<sup>5,11,16–18,20,22,24,27,28</sup> A number of different surgical procedures were performed but broadly these were arthroscopic in 13 elbows and open surgeries in 12 elbows. For arthroscopic treatment of trochlea lesion (Table 5), microfracture and debridement was carried out in over two-third of the cases (77%) followed by removal of loose bodies (23%). For open procedures, drilling or microfracture and debridement were the most common procedures (50%). A breakdown of procedures has been provided in Table 5.

## Operative vs non-operative treatment

Two studies compared non-operative to operative treatment. Wang et al.<sup>22</sup> treated all patients non-operatively initially with activity modification for 3 months and locked hinge brace if an acute presentations (pain <2 weeks).

A comparison of 9 patients managed non-operatively with 4 undergoing surgery at a mean follow-up of  $13 \pm 8$  months was reported. Surgery included drilling in 2 patients, olecranon osteotomy and OCD fixation with bioabsorbable implants in one patient and biopsy and bone graft implant in the 4<sup>th</sup> patient. 75% (3 of 4) patients undergoing surgery had resolution of pain, whilst in the non-operative group this figure stood at 66.6% (6 of 9). Ongoing crepitus was reported in 50% (2 of 4) of the surgical group and 55.6% (5 of 9) in the non-operative group.

Marshal et al.<sup>11</sup> described 13 patients with trochlear OCD, all whom were initially treated non-operatively. This included a period of rest followed by physiotherapy and gradual return to sport. Six patients (all lateral trochlea OCD) failed to improve hence ultimately underwent arthroscopy with the other 7 treated non-operatively (3 medial and 4 lateral trochlea OCD). Of the operative group, 3 patients had arthroscopy, synovial debulking and plica resection and the other three had debridement and microfracturing. Follow-up time was not stated but all had improvement of symptoms and had returned to sporting activities. Similarly, all non-operatively managed patients had resolution of symptoms and return to sporting activities.

**Table 2.** Characteristic of included studies.

Study	Population	Predominant symptoms (n elbows)	Sport (Overhead)	Lesion location (n)	Mean follow-up, months, (range)
Wang et al. 2019 n = 28	13.4 ( $\pm$ 1.6 SD) 13 Males	Pain (26/28) Crepitus (15/28) Locking (9/28) Loss of ROM (9/28)	28/28 (24/28)	Lateral (25/28) Medial (3/28)	13 ( $\pm$ 8 SD)
Collins and Tiegs-Heiden. 2019 n = 5	16 (15-19) All male	Pain (6/6) Crepitus (2/6)	5/5 (4/5)	Lateral (6/6)	7 (1-30)
Annamalai 2019 n = 1	11 Male	Pain (1/1) Loss of ROM (1/1)	1 (1)	Medial (1)	9
Naidu et al. 2017 n = 8	13.5 (11-17) 6 Males	Pain (8/8) Loss of ROM (5/8)	-	Lateral (8/8)	6
Kaji et al. 2015 n = 1	14 -	Pain in left elbow (1/2) Right elbow asymptomatic	1 (1)	Medial (1)	24
Alici 2015 n = 1	12 Male	Pain (1) Loss of ROM (1)	-	Lateral (1)	6
Lee and Kim 2014 n = 1	14 Male	Pain (1) Loss of ROM (1)	1 (1)	Medial (1)	5
Miyake et al. 2013 n = 1	14 Male	Pain (1) Loss of ROM (1)	1 (1)	Lateral (1)	24
Pruthi et al. 2009 n = 2	13 -	Pain (1/2) Crepitus (1/2) Clicking (1/2)	1/2 (1/2)	Lateral (2/2)	-
Namba et al. 2009 n = 1	19 Male	Pain (1) Loss of ROM (1)	-	Medial (1)	24
Marshall et al. 2009 n = 13	14 11 Males	Pain (13/13) Loss of ROM (10/13) Clicking (3/13)	9/13 (9/13)	Lateral (10/13) Medial (3/13)	-
Ansah et al. 2007 n = 1	15 Male	Pain (1) Loss of ROM (1)	1 (1)	-	50
Patel et al. 2002 n = 2	13 2 Males	Pain (3/3) Loss of ROM (1/3)	-	Medial (3)	36
Joji et al. 2001 n = 1	17 Male	Pain (1)	1 (1)	Lateral (1)	10

(continued)

Table 2. Continued

Study	Population	Predominant symptoms (n elbows)	Sport (Overhead)	Lesion location (n)	Mean follow-up, months, (range)
Vanthournout et al. 1991 n = 1	12 -	Pain (1) Loss of ROM (1) Crepitus (1)	1 (1)	Lateral (1)	-
Clarke et al. 1983 n = 3	12 2 Males	Pain (4/4) Loss of ROM (1/4)	-	Medial (4/4)	

ROM, range of motion; AVN, avascular necrosis; OCD, osteochondritis dissecans;

### Outcome of treatment

Outcome of non-operative or operative treatment were assessed subjectively only (Table 4). Resolution of symptoms was assessed in all but 2 studies.<sup>5,21</sup> In addition, radiological findings either by simple radiographs or repeat scans (MRI and/or CT) were evaluated in 10 studies.<sup>16–18,20,22–25,27,28</sup> Seven studies also reported on return to sports or activities.<sup>11,16,18,24–27.</sup>

Non-operative care was described in 63 elbows as the initial treatment choice however 15 (24%) elbows failed to improve resulting in 48 being treated purely non-operatively. Follow-up data for pain was available for 66.6% (32 of 48) of elbows whereas for range of motion this figure stood at 48% (23 of 48), with results indicating 91% resolution for both outcomes, respectively. Radiological assessment was available for 13 elbows. There was resolution of OCD in 6 (46%), improvement in 3 (23%), unchanged appearances in 2 (15%) and 1 (8%) was reported worse. Where applicable all patients who participated in sports returned to their usual activities.

Of the 25 patients treated operatively, follow up data was again incomplete. Pain resolution was reported in 95% (21 of 22) of elbows. Radiological resolution of OCD was described in only 8 elbows (32%) with all 8 displaying resolution. Data on return to sport was available for 13 patients and with all reported to have returned to previous activities.

### Gender differences

From the available data on gender, trochlea OCD was significantly higher in males compared to females ( $p < 0.0001$ ). There was no significant difference between arm dominance and overhead sports. Pain was still the most common presenting symptom in both genders. Lateral trochlea was more involved in both males and females compared to medial but there was no significant difference between the genders ( $p = 0.55$ ).

### Outcome of medial vs lateral trochlea

Complete data was available for 46 patients to analyse medial and lateral trochlea outcomes. There were 32

lateral and 14 medial trochlea OCD. There was no difference in arm dominance ( $p = 0.90$ ) or involvement in overhead sports. Definitive non-operative treatment was in 56% vs 57% cases of medial vs lateral respectively while operative treatment was also similar with 44% vs 43% cases of medial vs lateral respectively.

### Discussion

The main finding of this systematic review is that elbow trochlea OCD can be managed non-operatively with good resolution of symptoms in 91% of adolescents. Operative treatment is an option for those lesions not responding to conservative therapy including activity medication, immobilisation, physiotherapy and analgesics.

The main presenting symptoms of capitellum OCD in a recent SR was pain reported in 87.1% of studies.<sup>14</sup> In this SR, 100% (16/16) studies had reported pain as the most common symptom of trochlea OCD and was described in 95% of cases (70/74). Loss of range of movement is the second most common presenting symptoms (43%) while crepitus was described in 26% of the cases in this SR. The symptoms were more common on the dominant side (73%) and in overhead athletes (93%). Thus, a painful elbow in an adolescent doing overhead sports should prompt the clinician to review the trochlea for OCD in addition to capitellum.

In this SR, the lateral trochlea had the highest site of OCD (77%) and the ossification centres typically close between the ages of 13 to 16 years. The cause of trochlea OCD remains unclear but contributory factors as in all OCD include repetitive loading precarious bloody supply.<sup>29</sup>

There was no clear consensus on which trochlea OCD lesions would be suitable for open or arthroscopic surgery. In this SR, for arthroscopic treatment of trochlea lesion, microfracture and debridement was carried out in two-third of the cases (77%) followed by removal of loose bodies (23%). Open surgery included curettage,

**Table 3.** Summary of radiological findings of all studies.

Study	XR diagnosis	CT diagnosis	MRI diagnosis
Wang et al. 2019	Yes Initially deemed normal however on retrospective review radiolucency was observed in the trochlear region	No	Yes Most showed lateral trochlear OCD; >50% also had capitellar involvement
Collins and Tiegs-Haiden 2019	Yes Most were normal however 1pt had trochlea lucency and sclerosis	Yes Showed cystic lesions with hypertrophic bone and osseous fragments	Yes Identified bone marrow oedema, cystic changes and fragments
Annamalai 2019	Yes Trochlear sclerosis and fragmentation	No	Yes Trochlear fragmentation
Naidu et al. 2017	Yes Initially reported normal however on retrospective review - lucencies within intracondylar notch – mimicking pseudointracondylar notch	No	Yes Confirmed trochlear lesions
Kaji et al. 2015	Yes Radiolucent lesion in trochlear groove	Yes Confirmed x-ray findings	Yes Central trochlear OCD Subchondral defects
Nedeni 2015	Yes Radiolucent lesion in trochlear notch	No	Yes Lateral trochlea OCD/ AVN
Lee and Kin 2014	Yes Radiolucent lesion in trochlear groove	Yes Confirmed x-ray findings	Yes Medial trochlea OCD
Miyake et al. 2013	Yes Lateral trochlea OCD Lytic area with condensed borders in the intracondylar notch	No	Yes Lateral trochlea OCD
Pruthi et al. 2009	Yes Initially reported normal however on retrospective review - lucencies within the intracondylar notch – mimicking a pseudointracondylar notch	Yes Lateral OCD trochlea	Yes Lateral trochlea OCD
Namba et al. 2009	Yes Cubitus varus deformity and a radiolucent lesion in the ulnar area of the humeral trochlea, with condensed borders and a small fragment within the lesion	Yes Radiolucent area with a clear border and a small separated fragment in the central part of the ulnar side of the humeral trochlea	Yes Low-intensity area on the ulnar side of the trochlea
Marshal et al. 2009	Yes With hindsight most of the radiographs showed trochlear lucencies	Yes Performed but not described in detail	Yes Showed lateral and medial lesions
Ansah et al. 2007	Yes Not eluded which area of trochlea affected	No	Yes Not eluded which area of trochlea affected

(continued)

Table 3. Continued

Study	XR diagnosis	CT diagnosis	MRI diagnosis
Patel et al. 2002	Yes Medial trochlea OCD Radiolucency within trochlea	Yes Medial trochlea OCD Radiolucent area within the trochlea	Yes Medial trochlea OCD Trochlear radiolucency
Joji et al. 2001	Yes Medial trochlea OCD Trochlear fragmentation	Yes Medial trochlea OCD Trochlea fragment protrusion	No
Vanhournout et al. 1991	Yes Lateral trochlea OCD Lytic area with condensed borders in the trochlea	Yes Lateral trochlea OCD	Yes Lateral trochlea OCD Low signal on T1 W and T2 images + discontinuity of fragment
Clarke et al. 1982	Yes Increased density or fragmentation of trochlear epiphysis	No	No

OCD, osteochondritis dissecans; AVN, avascular necrosis.

drilling and debridement (50%) defect filled with bone graft (8.3%), from olecranon (8.3%) and lateral femoral condyle autograft (8.3%). In a recent SR, the most common arthroscopic procedure for capitellum OCD was removal of loose bodies and drilling ± debridement while most common open procedure was OATS (Osteochondral Autograft Transplantation) procedure.<sup>14</sup> However, previous studies on capitellum treatment have shown that open and arthroscopic procedures have similar return to sports.<sup>30–32</sup> Therefore, further studies are required before guidance can be provided on whether either arthroscopic or open procedures are optimal for trochlea OCD.

Resolution of symptoms were similar between the operative (95%) and non-operative groups (91%). However, follow up data was significantly lower in the non-operative group (60%) when compared to the surgical group (88%). Similarly, if we consider intention to treat analysis for the non-operative cohort then the overall success rate is significantly lower standing at 62% (29 out of 47). In studies that reported on activities both forms of treatment proved effective in returning their patients to their sports.

It is difficult to drive a consensus on which lesions are suitable for non-operative or operative treatment so each case must be assessed clinically and radiologically. Some authors have suggested using treatment guidelines for capitellar lesions<sup>20</sup> whereby lesions that remain intact can be managed non-operatively usually with a trial of immobilisation and analgesia.<sup>33,34</sup> If non-operative treatment has failed, surgery can be indicated when there is fracture of articular cartilage, for symptomatic removal of loose bodies or if there is a detached or displaced OCD

lesion.<sup>33,35,36</sup> However, extrapolating the use of guidelines of capitellar lesions for trochlea OCDs has not been proven. There were no re-operations reported in any studies for any reason and no complications other than one patient who had a femoral chondral autograft discomfort.

Where radiological findings were reported for trochlea OCD lesion, fragmentation was described as one of the features. Fragmentation has been reported in other bones of axial skeleton, as well as upper and lower limb and is described as part of osteochondrosis. In the axial skeleton, it has been described for Scheuermann disease whereas in appendicular skeleton it has been described for Panner disease (epiphysis of capitellum), Legg–Calvé–Perthes (proximal femoral epiphysis), Sever, Köhler (tarsal navicular) and Freiberg disease (deformities of the epiphyses of distal 2<sup>nd</sup> or 3<sup>rd</sup> metatarsal).<sup>37</sup> Osteochondrosis is most likely to be as a result of multiple factors such as poor vascular supply, microtrauma or even a traumatic event as is OCD of trochlea. It is therefore likely that trochlea OCD follows similar pattern to osteochondroses in other bones of the body and can be self-limiting in majority of the cases with resolution of symptoms following a trial of rest and physical therapy as in found in this SR. Osteochondrosis seems to affect the round bones and it seems that trochlea has similar round structure and may undergo a similar process.

There are several limitations of this systematic review. The studies only provide level IV and V evidence as well as providing only 75 elbows in 70 patients in total for analysis. There is heterogeneity in severity of lesion, outcome measures and operative techniques which limit collation of

**Table 4.** Operative or non-operative management.

Study	n (elbows)	Non-operative	Operative	Results
Wang et al. 2019	28	28	4 after failure of non-op	44% of non-op patients were asymptomatic 75% of surgical patients had resolution of pain
Collins and Tiegs-Heiden.2019	6	-	6	All patients returned to sports at 3 months
Annamalai 2019	1	1	-	Pain free at 3 weeks, returned to sport at 8 weeks. Remained symptom free at 9 months
Naidu et al. 2017	8	8	-	All patients improved at 6 months. 25% had loss of ROM
Kaji et al. 2015	2	1	1	Operated left improved symptomatically at 6 weeks, radiologically at 3 months non-op right asymptomatic and lesion was no longer present at 5 months
Alici 2015	1	1	-	Pain and complete ROM improved by 6 months
Lee and Kim 2014	1	1	1 after failure of non-op	At 5 months returned to baseball
Miyake et al. 2013	2	2	-	At 2yrs – remained asymptomatic and playing baseball
Pruthi et al. 2009	2	n/a	n/a	No mention of treatment
Namba et al. 2009	1	-	1	Eight months post-op patient was pain free and returned to previous activities
Marshall et al. 2009	13	13	6 after failure of non-op	All medial side trochlear OCDs improved with conservative care All surgical patients have returned to sporting activities
Ansah et al. 2007	1	1	1 after failure of non-op	At time of final follow up (50months), remained asymptomatic and both x-ray and MRI showed complete resolution of lesion
Patel et al. 2002	3	2	1	1 At 18 months full range of motion & at 3yrs asymptomatic 1 at 2yrs asymptomatic
Joji et al. 2001	1	1	1 after failure of non-op	5 months post-op returned to playing baseball
Vanthournout et al. 1991	1	-	1	Procedure was diagnostic – no mention of outcomes
Clarke et al. 1983	4	4	2 after failure of non-op	1 Symptoms resolved at 6 months – confirmed asymptomatic at 3yrs 1 post-op symptoms resolved within few months 1 At 2yrs had on/off symptoms – no further interventions
Total	75	63	25 (15 after failure of non-op)	



**Table 5.** Summary of operative treatment of elbow trochlea OCD.

Procedure	Open	Arthroscopic
Curettage, Microfracture/debridement, Drilling	6 <sup>b</sup> (50%)	10 <sup>a</sup> (77%)
Retrograde nailing	1 (8.3%)	-
Osteophyte/loose body removal	-	3 (23%)
Osteochondral transplantation from lateral femoral condyle (non-weight bearing area)	1 (8.3%)	-
Defect filled from olecranon / Bone graft	2 (16.7%)	-
Anterior capsular release	1 (8.3%)	-
Olecranon osteotomy and fixation of OCD	1 (8.3%)	-
Total	12	13

<sup>a</sup>included synovectomy and plica resection.

<sup>b</sup>also correction of varus deformity in one patient.

**Table 6.** Methodological index for non-randomised studies (MINORS) scores.

Study	MINORS Score
Wang et al. 2019	12
Collins and Tiegs-Heiden. 2019	11
Annamalai 2019	n/a
Naidu et al. 2017	14
Kaji et al. 2015	n/a
Alici 2015	n/a
Lee and Kim 2014	n/a
Miyake et al. 2013	n/a
Pruthi et al. 2009	n/a
Namba et al. 2009	n/a
Marshall et al. 2009	14
Ansah et al. 2007	16
Patel et al. 2002	10
Joji et al. 2001	n/a
Vanthournout et al. 1991	n/a
Clarke et al. 1983	10

data. A lack of any control groups means that direct comparison to other surgical techniques is not possible. Furthermore, only a handful of post-operative patients had any radiographic follow-up with no two patients having had the same surgical treatment and therefore

making any comparison to be objective. Table 6 illustrates the MINORS criteria which ranged from 10 to 16 showing the overall quality of the papers included was low. Furthermore, studies with larger series of patients had significant loss to follow up conversely limiting meaningful interpretation of overall results.<sup>16,22</sup>

As there is limited information in literature on this rare pathology, this SR provides an overview on management of elbow trochlea OCD and suggests that non-operative treatment should be trialled with a period of immobilisation and analgesics and physical therapy.

Based on this review we suggest the following recommendations: (1) Trochlea OCD is a rare condition in adolescents, but should be considered in the overhead athlete, with elbow pain. (2) Imaging should include plain radiographs and MRI, however if still inconclusive then a CT can be utilised to evaluate subchondral bone separation. (3) A trial of non-operative treatment for up to 6 months such as rest/activity modification; immobilisation/splinting, physiotherapy and/or analgesics should be considered initially however if no resolution in symptoms then surgical intervention can be recommended. (4) Lastly, we suggest elbow trochlea OCD patients following initial investigation and treatment plan (operative or non-operative) have interval follow-up at 1, 3 and 5 years to understand the pathology better. Furthermore, patient reported outcome measures pre- and post-treatment would give an objective assessment of the elbow function following the treatment plan.

## Conclusion

Elbow trochlea OCD is a rare pathology that usually presents with pain in the overhead young athlete. The majority of cases can be managed non-operatively with good resolution of symptoms.

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