

ONCOLOGY

What factors are associated with osteoarthritis after cementation for benign aggressive bone tumor of the knee joint: a systematic review and meta-analysis

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- **Background:** The current systematic review aimed to answer the following questions: (i) Does extended curettage combined with the PMMA technique for the treatment of aggressive bone tumors around the knee led to the development of knee osteoarthritis? (ii) What factors are associated with osteoarthritis after bone cementation around the knee joint?
- **Methods:** This study was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. All electronic searches were performed on November 20, 2022, by a single researcher who evaluated the full texts of potentially eligible studies to determine inclusion. In these patients, the presence of osteoarthritis secondary to the surgical procedure was investigated. Data extracted included study type, characteristics of participants, sample size, gender, tumor site (femur or tibia), secondary osteoarthritis, tumor volume, distance from the joint cartilage, reoperation, follow-up time, Campanacci grade, and pathological fracture.
- **Results:** In total, 11 studies comprising 204 patients were evaluated, and it was found that 61 (30%) patients developed knee osteoarthritis due to extensive curettage and bone cement application for benign aggressive tumor treatment. According to the results obtained based the random effects model with the 11 studies included in the meta-analysis, the mean odds ratio of development knee OA with the 95% CI was calculated as -2.77 (-3.711 , -1.83), which was statistically significant ($z = -5.79$; $P < 0.000$).
- **Conclusion:** The association of distance between the tumor and joint cartilage and development of osteoarthritis was not shown in this meta-analysis.
- **Level of Evidence:** Level IV prognostic study.

Keywords: bone tumor; knee osteoarthritis; bone cement; giant cell bone tumor

Introduction

In orthopedic oncological practice, intralesional curettage and bone cementation are performed routinely for the treatment of benign aggressive bone tumors such as giant cell tumor of bone (GCTB) (1). Bone cement (especially polymethylmethacrylate (PMMA)) is used to decrease the risk of local recurrence, as it has a high temperature and burns all tumor cells. One of the major reasons for using PMMA is that it allows for immediate weight bearing postoperatively. In addition, one of its most important benefits is an easier detectability of radiographic recurrence of benign aggressive bone tumors (2, 3). Besides such important benefits, bone cement also has some side effects on healthy tissue, the most important being thermal damage. Thus, using bone cement could accelerate articular damage and joint degeneration due to thermal chondronecrosis (4, 5).

The etiology of joint degeneration is multifactorial, including genetic, mechanical, and environmental factors. Major or minor traumas are the leading mechanical factors that cause joint degeneration through bone, cartilage, ligament, and meniscus damage (6, 7). Damage to all of these tissues can negatively affect joint stabilization and led to the onset of the joint degeneration process. Iatrogenic injuries also cause joint damage, especially after knee arthroscopy (8). The development of osteoarthritis after knee surgery in patients who underwent anterior cruciate ligament reconstruction surgery or diagnostic knee arthroscopy surgery has been reported in the literature (9). Extended curettage and full filling with bone cement for aggressive bone tumor around the knee is also associated with knee osteoarthritis (9). The hyperthermic polymerization of PMMA may cause damage to the articular cartilage, and the stiffness of the material used to fill the cavity after curettage of a benign aggressive tumor may decrease the joints' ability to absorb shock (10). However, it remains unclear whether it is the proximity of the tumor to the joint or the application of bone cementation that accelerates the degenerative process of the knee joint.

The current meta-analysis therefore aimed to answer the following questions: (1) Does extended curettage combined with the PMMA technique for the treatment of aggressive bone tumors around the knee led to the development of knee osteoarthritis? (2) What factors are associated with osteoarthritis after bone cementation around the knee joint?

Materials and methods

Search strategy

This study was performed according to the guidelines of the Preferred Reporting Items for Systematic Reviews

and Meta-Analyses (PRISMA) (11, 12). All electronic searches were performed on November 20, 2022, by a single researcher who evaluated the full texts of potentially eligible studies to determine inclusion. We systematically searched the PubMed, Web of Science, Scopus, and CINAHL Library electronic databases to retrieve eligible articles from the inception of the databases until November 2022. We used the following terms: 'Knee osteoarthritis', 'polymethylmethacrylate', 'articular degeneration', 'cementation', 'curettage and cementation', 'Aggressive bone tumor', 'Giant cell tumor at knee', and 'Secondary osteoarthritis', with the Boolean operators 'AND' and 'OR' by title (Supplementary material, see the section on [supplementary materials](#) given at the end of this article) We also hand-searched references from included articles to ensure that no relevant articles were missed.

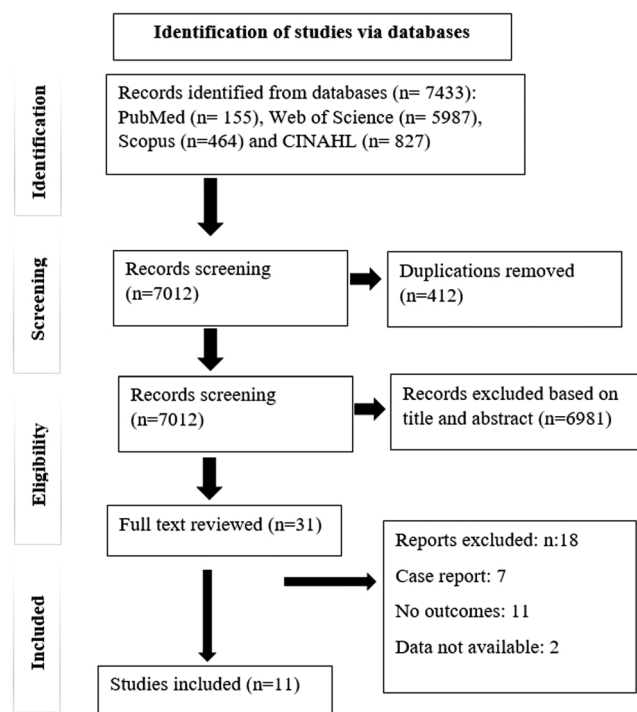
Eligibility criteria and study selection

Patients with benign aggressive bone tumor around the knee treated with extended curettage and filling with PMMA were included. The presence of a control group was not a criterion for inclusion in this review. Full-text articles in English language and studies reporting radiological outcomes during follow-up, including articular degeneration after extended curettage and filling with PMMA, were included. We excluded abstracts, letters to the editor, review articles, case reports, unpublished studies, animal experimental studies, articles posted on preprint servers, studies evaluating PMMA treatment results in regions other than the knee, those evaluating bone grafting for the treatment of benign aggressive bone tumor, studies of only metaphyseal lesions that are distant from the joints, studies with inadequate follow-up to assess articular degeneration, studies with duplicate or overlapping data, and studies whose data could not be converted and merged for analysis.

Our search identified 7433 records for screening, which were reduced to 7012 after duplicate records were removed. Of these, 6981 were excluded after screening the titles and abstracts. Full-text articles were obtained for the remaining 31 articles, 20 of which were excluded because they did not meet the inclusion criteria (Fig. 1). The outcome data were presented alongside the 11 identified studies (13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23) that were eligible for inclusion in the study (Table 1).

Data items

We extracted data from all included trials in duplicate into spreadsheets for analysis (Microsoft Excel, version 16.2). Data extracted included study type, characteristics of participants, sample size, gender, tumor site (femur or tibia), secondary osteoarthritis, tumor volume, distance from the joint cartilage, reoperation, follow-up time, Campanacci grade, and pathological fracture. Evaluation

**Figure 1**

PRISMA flowchart showing the studies that were included in our review.

of the knee osteoarthritis stage was performed using the Kellgren and Lawrence classification system, with grading from 0 to 4 relative to the contralateral knee (24). In these patients, the presence of osteoarthritis secondary to the surgical procedure was investigated. Therefore, the time of secondary osteoarthritis following the PMMA application was defined as the time at which signs of osteoarthritis appeared to have progressed at the final follow-up compared to both the preoperative grade and the contralateral knee grade. The relationship between osteoarthritis and the distance of the tumor

to the subchondral bone was particularly investigated. The area of subchondral bone involvement was defined as the area of the affected knee compartment in which <3 mm of subchondral bone thickness remained, as assessed by radiography or computed tomography. This method of calculation was described by Chen *et al.* (25). Campanacci grading was used to grade the benign tumor, which consist of three stages: stage 1 lesions were intraosseous, stage 2 lesions were intraosseous lesions with cortical thinning, and stage 3 lesions were extended extraosseous lesions (26).

After screening, the full texts of the eligible articles were read independently by the two authors, and the eligibility of each article was reassessed.

Quality assessment

The methodological quality of the included studies was examined using the Newcastle–Ottawa scale (27), which is used for the quality assessment of both cohort studies and case–control studies. In our analysis, eight studies were assessed with the Newcastle–Ottawa scale for cohort studies and three studies with the Newcastle–Ottawa scale for case–control studies. The quality of each study was graded as good, fair, or poor (27). All studies were determined to be of good quality (Table 2).

Statistical analysis

Data analysis for continuous quantitative data was performed using Stata 16 software. The difference between means was evaluated with an alpha value of 0.05 and a CI of 95%. Heterogeneity among the studies included, that is, whether the studies showed the same effect or not, were evaluated using Cochrane's Q statistic (χ^2 $P < 0.10$) tau H^2 and I^2 . In this study, heterogeneity was examined with I^2 , and other statistics were also calculated. Random effects model was used

Table 1 Study demographics data.

Study	Year	Country	Study design	Sample size	Age,* years	M:F	Follow-up,* months
Wechsler <i>et al.</i> (13)	2022	Switzerland	RCS	14	34	7:7	54.6
Fraquet <i>et al.</i> (14)	2009	France	RCS	26	36	18:12	76
Caubère <i>et al.</i> (15)	2017	France	RCS	19	46.6	8:11	120
Szalay <i>et al.</i> (16)	2006	Hungary	RCCS	50	32.4	–	84
Kafchitsas <i>et al.</i> (17)	2010	Germany	RCCS	16	28	–	8.7 years
Kito <i>et al.</i> (18)	2017	Japan	RCCS	5	33	4:1	28.1 years
van der Heijden <i>et al.</i> (19)	2013	Netherlands	RCS	53	42	24:29	86
Wada <i>et al.</i> (20)	2002	Japan	RCS	15	38	5:10	46
von Steyern <i>et al.</i> (21)	2007	Sweden	RCS	9	29	6:3	11 years
Xu <i>et al.</i> (22)	2019	China	RCCS	23	31.1	40:36	35
Araki <i>et al.</i> (23)	2020	Japan	RCS	19	39	7:12	131

*Mean values are presented.

RCS, retrospective cohort study; RCCS, retrospective case–control series; M:F, male:female.

Table 2 Quality assessment of the studies included in this meta-analysis based on the Newcastle–Ottawa scale.

Reference	Selection				Comparability	Outcome			Total score
	S1	S2	S3	S4		O1	O2	O3	
Cohort studies									
Wechsler <i>et al.</i> (13)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)
Fraquet <i>et al.</i> (14)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)
Caubère <i>et al.</i> (15)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)
Araki <i>et al.</i> (23)	Y	Y	Y	Y	Y	Y	Y	Y	
Kito (18)	-	Y	Y	Y	Y	Y	Y	Y	7 (good)
van der Heijden <i>et al.</i> (19)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)
Wada <i>et al.</i> (20)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)
von Steyern <i>et al.</i> (21)	-	Y	Y	Y	Y	Y	Y	Y	7 (good)
Case-control studies									
Xu <i>et al.</i> (22)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)
Szalay <i>et al.</i> (16)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)
Kafchitsas <i>et al.</i> (17)	Y	Y	Y	Y	Y	Y	Y	Y	8 (good)

For cohort studies: S1, representativeness of the exposed cohort; S2, selection of the non-exposed cohort; S3, ascertainment of exposure; S4, outcome of interest was not present at start; O1, ascertainment of outcome; O2, adequacy of duration of follow-up; O3, adequacy of completeness of follow-up.

For case-control studies: S1, adequate definition of case; S2, representativeness of control; S3, selection of control; S4, definition of control; O1, ascertainment of outcome; O2, same method of ascertainment for cases and controls; O3, nonresponse rate.

if $I^2 > 0.50$, while fixed effects model was preferred if $I^2 < 0.50$. Publication bias was determined using Funnel Plots and Begg and Egger tests. In the meta-analysis, the random effects model conducted with the hedge method was taken into account.

Results

A total of 11 studies comprising 204 patients were evaluated, and it was found that 61 (30%) patients developed knee osteoarthritis due to extensive curettage and bone cement application for benign aggressive tumor treatment (Table 3).

Statistical prediction models in meta-analysis are divided into two groups: 'fixed effects model' and 'random effects model'. The studies were scored differently using these estimation models to estimate the mean

effect value. While it is essential that all the studies compiled in the fixed effects model estimate the same effect, studies estimating different effects could be analyzed in the random effects model. Thus, deciding on the estimation method to be used for the study is essential. At this stage, tests developed to choose between the fixed and random effects models were applied, and it was determined that the I^2 statistics were not $> 50\%$, and that the studies showed the same effect ($I^2 = 0.000$). Thus, the random effects model was found to be suitable, and the fixed effects model using the inverse-variance method was used for calculating the effect sizes. According to the results obtained based on the random effects model with the 11 studies included in the meta-analysis, the mean odds ratio of development knee OA with the 95% CI was calculated as -2.77 (-3.711 , -1.83), which was statistically significant ($z = -5.79$; $P < 0.000$) (Fig. 2).

One of the most important factors affecting the accuracy of the results of a meta-analysis is the existence of publication bias, which is considered as a challenge by researchers. While it is possible that studies with positive results have a high chance of publication, studies with small sample sizes are less likely to be published. Therefore, publication bias should be examined in absolute terms. Funnel charts are one of the best, easy, and understandable ways of evaluating the effect of publication sample sizes on results. In the funnel graphs, which look like a scatter plot, the effect size is on the horizontal axis, and the sample size of the specific study is on the vertical axis. It can be said that no publication bias exists if the funnel plot gathers around a center and shows a symmetrical distribution. However, it is difficult to draw a conclusion from the graphics alone, especially in cases where the number of publications is low. Therefore, both funnel plots

Table 3 Number of patients and OA events.

Study	Sample size	OA events
Wechsler <i>et al.</i> (13)	14	3
Suzuki <i>et al.</i> (9)	36	7
Kafchitsas <i>et al.</i> (17)	16	9
Fraquet <i>et al.</i> (14)	26	1
Caubère <i>et al.</i> (15)	19	8
Araki <i>et al.</i> (23)	19	5
Kito <i>et al.</i> (18)	5	5
van der Heijden <i>et al.</i> (19)	28	5
Wada <i>et al.</i> (20)	15	1
von Steyern <i>et al.</i> (21)	9	1
Xu <i>et al.</i> (22)	23	13
Total	204	61

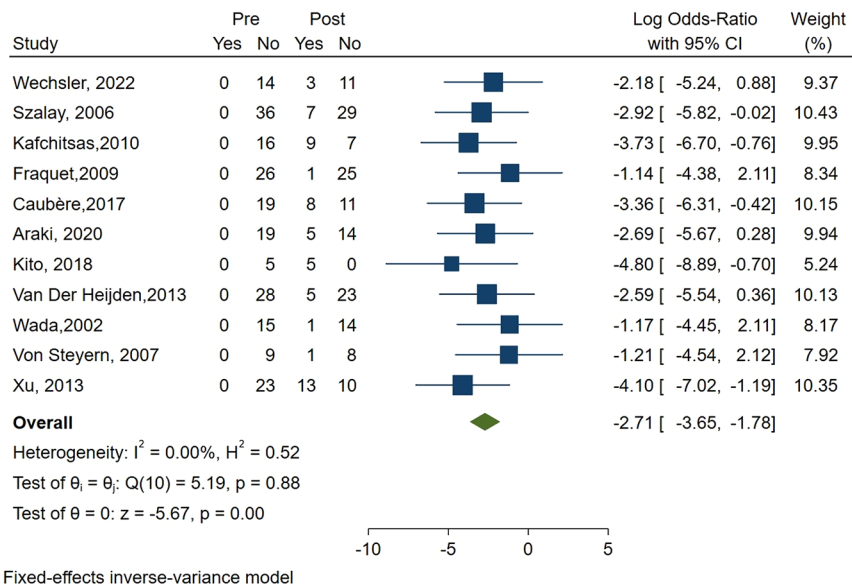


Figure 2
Meta-analysis graph (forest plot) in which the odds ratios of the studies covered in the meta-analysis are given. The longer the horizontal lines in each square, the odds ratios of which are indicated by a square, the wider the confidence interval.

and statistical tests were used in this study (Fig. 3 and Table 4).

The rank correlation test (Begg test) and linear regression test (Egger test) were used to assess publication bias. According to the Egger test result, the hypothesis ‘no small study effect’ cannot be rejected. No minor study effect was found.

Age: Although 61 patients developed secondary osteoarthritis in the 11 studies, the ages of patients who developed osteoarthritis were found in only three studies. Therefore, these data were not included in the meta-analysis, as there was not enough data in the studies. In a study of 19 patients by Araki *et al.*, it was reported that secondary osteoarthritis developed

in five patients. In this study, the mean age of patients with secondary osteoarthritis was 42, while the others were 30 ($P < 0.001$) (23). In another study, van der Heijden *et al.* (19) reported that age did not affect the progression to knee osteoarthritis.

Gender: Seven of the 61 patients in the 11 studies who developed osteoarthritis were male, and four were female. According to the results obtained from the random effects model with three studies included in the meta-analysis, the mean odds ratio of development knee OA with the 95% CI was calculated as -0.07 (-0.51 , -0.37). As a result, it was concluded that the mean effect size was not statistically significant ($z = -0.32$; $P = 0.75$).

Tumor site (femur or tibia)

The tumor was located in the distal femur in eleven patients and in the tibia in four patients who developed osteoarthritis. According to the results obtained from the fixed effects model with four studies included in the meta-analysis, the mean odds ratio of development knee OA with the 95% CI was calculated as 0.87 (-0.38 , -2.13). As a result, the mean odds ratio of development knee OA was found to be statistically insignificant ($z = 1.36$; $P = 0.09$) (Figs. 4 and 5).

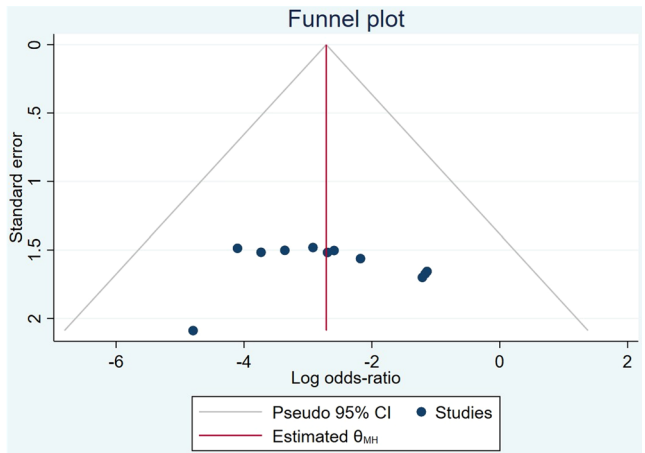


Figure 3
In the funnel graphs, which look like a scatter plot, the odds ratio is on the horizontal axis, and the sample size of the specific study is on the vertical axis. It can be said that there is no publication bias if the funnel plot gathers around a center and shows a symmetrical distribution.

Table 4 Egger and Begg Test results of meta-analysis.

Test	Result
Egger test	
Z	0.17
P	0.8649
Begg test	
Z	1.40
P	0.1611

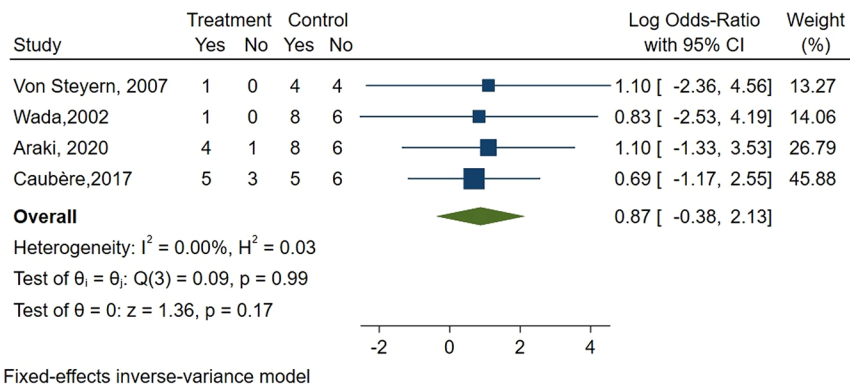


Figure 4
Data obtained according to the fixed-effects model with four studies included in the meta-analysis. The mean odds ratio was calculated as 0.87 (95% CI: -0.38, -2.13).

Reoperation

A history of reoperation was determined in 8 of 61 patients who developed osteoarthritis. According to the data obtained according to the random effects model with 3 studies included in the meta-analysis, the mean odds ratio of development knee OA with the 95% confidence interval was calculated as -0.28 (-0.11, -0.67). As a result, the mean effect size was found to be statistically insignificant ($z = 1.40$; $P = 0.16$).

Distance to the joint cartilage

Although the main factor investigated by all the studies on this subject was the distance of the tumor to the articular cartilage, it could not be included in the meta-analysis due to the insufficient data in the studies. Wechsler *et al.* (13) reported a study that included 14 patients, three of which developed osteoarthritis. In their study, they emphasized that progressive degeneration tended to be associated with the proximity of the tumor to the articular cartilage (mean 1.57 mm). Caubère *et al.* (15) conducted a study

including 19 patients and found that the eight patients who developed knee osteoarthritis had a tumor that was significantly closer to the joint cartilage (mean 3.4 mm) than the 11 patients who did not develop osteoarthritis (mean 10.5 mm).

Tumor volume

Tumor volume was also evaluated in almost all studies, but only two studies provided detailed information on tumor volume. Therefore, this data was not included in the analysis. Caubère *et al.* (15) and Araki *et al.* (23) reported that tumor volume was higher in patients with than in those without osteoarthritis.

Follow-up time

Most studies in the analysis reported long-term outcomes of patients, but these could not be included in the meta-analysis due to missing data.

Pathological fracture

Only two studies provided detailed information about pathological fracture. Hence, these data have not been included in the analysis. Kafchitsas *et al.* (17) reported a study involving 16 patients, 6 of whom had a pathological fracture history. In the study, all the patients with pathological fracture developed knee osteoarthritis at the final visit. In another study, von Steyern *et al.* (21) reported the results of nine patients, and one of the patients, who had a pathological fracture history, developed knee osteoarthritis.

Discussion

Aggressive benign tumors adjacent to the articular cartilage remain a concern with regards to the application of PMMA following extensive resection for the treatment of these tumors. The exothermic reaction triggered by the *in situ* polymerizing PMMA is believed to be beneficial for killing residual tumor

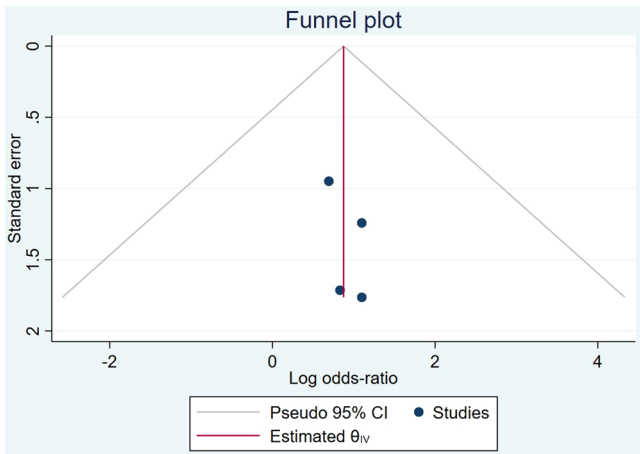


Figure 5
Funnel plot that gathers around a center and shows a symmetrical distribution.

cells. However, the extent of this necrotic effect into the surrounding normal bone and the adjacent articular cartilage remains an issue. In a study, Radev *et al.* studied the thermal effects of the size and position of the PMMA implant using computer-based finite element analysis (28). For this purpose, PMMA implants (8–24 mL in volume) were placed into a peripheral, sagittally symmetric, metaphyseal defect in the proximal tibia. In this study, exposure time conditions indicating the necrotic potential during the exothermic reaction of the polymerizing bone cement were found in regions of the cancellous bone within 3 mm of the superior surface of the PMMA implant. Additionally, they emphasized that there were at least 2 mm of uniform subchondral bone above the PMMA implant, and the necrotic regions did not extend into the overlying articular cartilage.

As it is known that knee osteoarthritis can occur after cement application following extensive curettage, alternative surgical procedures have been developed. One of the most used techniques is subchondral bone grafting, which is applied as a buffer zone to avoid the harmful effects of cementation (28, 29, 30). Ayerza *et al.* reported 22 patients who were diagnosed with GCTB close to the knee and treated with intralesional curettage that combined both morselized bone and cortical structural bone graft (29). In that study, only one patient had recurrence, and no patient had a fracture, an infection, or knee instability. He *et al.* reported a large case series that included 93 patients diagnosed with GCTB around the knee joint (31). In that study, 69 patients were treated with extended curettage and cement filling combined subchondral bone grafting (5–10 mm) to repair bone defects, while 24 patients were treated with segmental resection. Of the 69 patients, 5 developed recurrences at the 18 months' follow-up. In addition, non-oncological complications were observed more frequently in the extended curettage group than in the segmental resection group. Wu *et al.* reported a study that included 27 patients diagnosed with GCTB around the knee and treated with subchondral autograft bone grafting followed by cement reconstruction and internal fixation (32). In that study, with an average follow-up of 32.9 months, 24 patients did not develop radiographic findings of osteoarthritis, while two patients progressed to KL1, and one patient progressed to KL2 at the final visit. In a large series, Gaston *et al.* reported the outcomes of 330 patients with GCT treated with intralesional curettage and 84 patients treated with intralesional curettage with adjuvant bone cementation (10). In that study, they emphasized that the use of bone cement was associated with a higher risk of osteoarthritis, requiring joint replacement. Since the joint in which joint osteoarthritis developed was not specified in the study, this data was not included in the meta-analysis.

Studies comparing the results of cases in which the subchondral bone was supported by bone graft and cases where cement was applied following extended

curettage have also been published. Szalay *et al.* reported their result about this subject, which consisted of 44 patients who underwent curettage followed by bone grafting, and 36 patients who underwent curettage followed by cementation (16). In their study, degenerative joint changes were found in six patients in the bone grafting group and three patients in the cementation group at the 24-month follow-up. However, seven patients had degenerative changes in cementation group at the 50-month follow-up. Kafchitsas *et al.* reported a case-control study that included a total 38 patients, 21 of whom were treated with a bone cement filling after curettage, 10 patients with curettage and filling with cancellous bone, and 7 with curettage alone (17). According to their results, they concluded that cementation does not increase the recurrence rate or induce osteoarthritis. Therefore, patients with GCTB near the knee joint can be treated satisfactorily with bone cementation. Xu *et al.* reported a case-control study consisting of 76 patients with GCTB around the knee (22). In that study, 13 of 23 patients in the bone cement filling after curettage group had degenerative arthritic changes, compared to 10 of 34 patients in the curettage and filling with bone grafting group, and there was significant difference between the groups ($P=0.041$). Additionally, the authors emphasized that less than 10 mm of the residual thickness of the remaining subchondral bone after extended curettage was correlated with secondary degenerative arthritic changes.

This study has some limitations. First, articles finally included in this meta-analysis, including three case-control studies, and eight retrospective cohort studies, were not of high quality. High-quality studies, such as randomized controlled prospective studies and prospective cohort studies are ideal for meta-analyses. Although the studies included in the meta-analysis examined all the factors mentioned above (tumor volume, distance of joint cartilage, reoperation), we could not include all factors from all 11 studies, as data from patients with degenerative changes were mostly missing. Obesity and higher body mass index (BMI) are one of the major factors leading to the development of osteoarthritis, especially in the lower extremity. Fowler-Brown *et al.* also reported that a 5 kg/m² increase in BMI was associated with a 32% increase in the risk of osteoarthritis (33). Second, none of studies in literature and in our analysis investigated the relationship between BMI and developing degenerative arthritic changes in patient with GCTB around the knee joint. The most important limitation of this analysis is that the distance between the tumor and the joint cartilage, which is mentioned in almost all studies and emphasized to be associated with the development of osteoarthritis, could not be included in the analysis because we did not have access to individual patient data. For example, Xu *et al.* also investigated the relationship between the distance between the tumor and joint cartilage and the development of

osteoarthritis in patients with GCTB (22). However, they divided the patients into two groups as <10 mm and >10 mm of residual thickness of the subchondral bone and compared them. In addition, Araki *et al.* (23). reported the averages the distance between the tumor and joint cartilage, and made comparisons between the degenerative and nondegenerative groups. Lastly, the patient follow-up periods were different in the studies, and the degenerative changes were not classified according to the Kellgren–Lawrence staging in all studies, which is an objective evaluation system.

Conclusion

GCTB around the knee is very common, which is treated by applying bone cement after wide curettage. This meta-analysis shows that bone cementation for GCTB around the knee joint is associated with 2.7 times higher odds of subsequent knee osteoarthritis. In addition, the presence of GCTB on the femoral side is a risk factor for the development of osteoarthritis. The association of distance between the tumor and joint cartilage and development of osteoarthritis was not shown in this meta-analysis. Although this meta-analysis has considered very limited number of aspects, it provides estimates for the risk of knee osteoarthritis following bone cementation after extended curettage for the treatment of GCTB around the knee joint. There is an indicated that filling the region near the joint with bone graft after extensive curettage diminishes the likelihood of osteoarthritis development. To definitively illustrate this scenario, randomized controlled studies comparing bone cementation and bone grafting after extensive curettage are necessary. Due to the absence of individual patient data in these retrospective cohort and case-control studies, along with the scarcity of prospective studies boasting high follow-up rates, future high-quality studies may alter the estimates.

Supplementary materials

This is linked to the online version of the paper at <https://doi.org/10.1530/EOR-23-0189>.

ICMJE Conflict of Interest Statement

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the study reported.

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Availability of data and materials

Not applicable as this is a review article. However, happy to provide access to any statistical data (coding) upon request.

Author contribution statement

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data and took part in drafting the article or revising it critically for important intellectual content.

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