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Research Article

Outcome of Gap Arthroplasty in Cats with Temporomandibular Joint Ankylosis: A Retrospective Study

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Abstract

This retrospective study describes the clinical features, imaging results, surgical management and long-term outcomes of gap arthroplasty (GA) in cats diagnosed with temporomandibular joint (TMJ) ankylosis. The medical data including signalment, clinical presentation, CT findings, surgical management, and follow-up results was obtained from previous patient records between 2020 to 2024. The mean age of the cats was 23.3 months. Of the 10 cats included, six were male and four were female. The study population consisted of four Domestic Shorthair cats, four Scottish Folds, and one cat each of the British Shorthair and British Longhair breeds. Trauma was the primary cause of ankylosis. Unilateral involvement was more common than bilateral, predominantly affecting the left joint. GA surgery was achieved using conventional surgical instruments rather than piezoelectric surgical devices. Bilateral GA was performed in two cats with bilateral ankylosis, while two other cats required contralateral surgery after recurrence. Immediate postoperative improvement in mandibular motion was achieved in all cases. Outcomes were classified as excellent in 3 cats, good in 4 cats, fair in 1 cat, and excellent after a second procedure in 2 cats that initially had poor outcomes. Owner-reported quality of life markedly improved at a mean follow-up of 16.8 months. Despite the lack of postoperative imaging, clinical outcomes were consistently favorable. According to results of this study, GA remains a reliable, accessible, and cost-effective surgical option, particularly in cats with advanced ankylosis or poor body condition.

Keywords: Arthroplasty, Cat, Computed tomography, Malocclusion, Temporomandibular ankylosis

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Introduction

The temporomandibular joint (TMJ) is a synovial condylar articulation between the condyloid process of the mandible and the mandibular fossa of the temporal bone and provides the hinge-like motion required for mouth opening and closing. In dogs, slight laterotrusion is possible, whereas in cats, lateral mandibular movement is minimal because of the restrictive morphology of the joint [1-3].

Fractures, tearing, contracture, fibrosis of periarticular soft tissues, luxation, congenital malformations, infections and neoplasia may result with dysfunction of the TMJ and further with intra-articular (true ankylosis) and/or extra-articular ankylosis (false-pseudoankylosis) [4-7]. Traumatic lesions that may lead to ankylosis include luxation of the condylar process with or without fractures of the condylar process, mandibular fossa, retroarticular process, coronoid process, or zygomatic arch [8,9]. Additionally, it has been noted that TMJ ankylosis in cats, both intra-articular and extra-articular components' osseous bridging and degenerative joint changes as well as complex fractures involving the mandibular fossa, is usually results in permanent ankylotic fusion [10].

TMJ ankylosis has severe clinical consequences, impairing feeding, grooming, thermoregulation, and drinking, and may cause malnutrition, malocclusion, periodontal disease, and mucosal ulceration [2,5,11,12]. In cats, tongue entrapment and life-threatening airway obstruction may occur due to severe ankylosis. Diagnosis relies on clinical signs, such as restricted mandibular motion, malocclusion and facial asymmetry, supported by advanced imaging. Computed tomography (CT) and cone-beam CT (CBCT) are considered the gold standards, with multiplanar and 3D

reconstructions providing detailed lesion characterization and guiding the surgical planning [13-17].

Surgical intervention is the treatment of choice in most of the cases with TMJ ankylosis. Although conservative management consists of stretching maneuvers combined with periarticular corticosteroid administration have been described as a means of improving mandibular range of motion and relieving discomfort, this merely postpones the need for surgery. Nonetheless, most cases require surgical intervention, even if they initially respond to conservative therapy [12,18].

Surgical treatment is considered the preferred method in cases where the clinical course is severe, or conservative treatment does not provide sufficient functional improvement. Reported techniques include gap arthroplasty (GA), interpositional arthroplasty (IA), excisional ostectomy, and segmental mandibulectomy (SM) [5,18-21]. IA techniques have employed autogenous tissues such as temporal muscle, fascia, or fat, or synthetic materials such as silicone and PTFE [22,23]. Among these, gap arthroplasty remains the most widely described and continues to be the preferred technique in severe cases, as it restores mandibular motion by creating a functional gap between the condylar process and the temporal bone [11]. Despite being invasive, GA has been associated with favorable functional outcomes when combined with appropriate postoperative care and physiotherapy [11,18,21]. In humans, gap arthroplasty also has been demonstrated to provide satisfactory long-term functional results for temporomandibular joint (TMJ) ankylosis [24].

This study reports the clinical and CT features, surgical technique, and outcomes of gap arthroplasty in cats with extensive TMJ ankylosis, contributing to species-specific outcome data to guide surgical decision-making.

Material and Methods

Ethical Statement

The study was approved by Animal Experiments Local Ethics Committee of Ankara University on 23/07/2025 under decision number 2025-14-156. An "Informed Consent Form" was obtained from the animal owners before examination of animals.

Case Inclusion

The patient recording system of the Ankara University Faculty of Veterinary Medicine Animal Hospital was retrospectively reviewed, the cats with a diagnosis of TMJ ankylosis treated by GAP arthroplasty between January 2020 and December 2024 were included in the study. The cats which have missing information of medical records including anamnesis, clinical findings, radiographic examination and minimum follow up time of 6 months were excluded from the study.

Medical Records

Information was obtained from the medical records including signalment, anamnesis, physical examination, laboratory analyses, diagnostic imaging results, surgical treatment, post-operative care and outcome. Follow-up information on the cases were obtained from medical records and telephone interviews with owners.

Computed Tomography

Spiral computed tomography (CT) examinations were performed using a 32-slice CT scanner (Supria model, Fujifilm Healthcare Corporation, Japan) available at the Ankara University Faculty of Veterinary Medicine, Department of Radiology. All cats were positioned in sternal recumbency (head-first) and scanned under general anesthesia. Acquisition parameters included 120 kV, 300 mAs, and a slice thickness of 1.25 mm. For image evaluation, a window level of 750 HU and a window width of 3500 HU were applied. Anesthesia induction was achieved with intravenous (IV) administration of butorphanol (0.1 mg/kg), followed by diazepam (0.3 mg/kg) and propofol (4 mg/kg). Due to restricted mouth opening and short scanning duration, none of the cats were intubated during CT imaging. Three-dimensional reconstructions of the images used for publication were created using OsiriX Lite DICOM software.

Surgical Technique

Anesthesia was maintained as described in the CT protocol. To facilitate intubation, gentle manual traction was applied to the mandibular and maxillary premolar teeth using gauze bands until sufficient oral opening allowed placement of the laryngoscope. Tracheostomy was required in only one case. Anaesthesia was maintained with isoflurane in oxygen, and cefazolin sodium (25 mg/kg IV) was administered perioperatively. Continuous infusion of butorphanol-ketamine in 0.9% NaCl (3-5 mL/kg/hour) provided intraoperative analgesia. Cats were placed in lateral recumbency with their heads slightly elevated. As previously described [11], a full-thickness incision was made along the ventral zygomatic arch using a lateral approach, and the periosteum was elevated to expose the zygomatic arch, coronoid and condylar processes, and mandibular fossa. The tissues were retracted with a Hohmann retractor or a periostal elavator, later zygomectomy, coronoidectomy and condylectomy were performed using an osteotome and mallet *(Fig. 1)*. Recontouring of the mandibular fossa (fossectomy) was accomplished using a rongeur, and all remaining surface irregularities were meticulously smoothed with a bone file to obtain a uniform and anatomically congruent articular gap. The area was irrigated with saline and closed in a routine manner. In cases when CT imaging revealed bilateral ankylosis, bilateral gap arthroplasty was performed

during the same operative session. Contralateral GA was performed, if postoperative re-ankylosis occurred.

Post-Operative Care and Follow up

Postoperatively, amoxicillin-clavulanate (Klamoks® BID 200 mg-28 mg/5mL, Bilim) (22.5 mg/kg PO, q12h) was administered for 7 days. For analgesia, meloxicam (Metacam®, 0,5 mg/mL, Boehringer Ingelheim) (0.05 mg/kg PO, q24h) and tramadol (Contramal®, 100 mg/mL, Abdi İbrahim) (2 mg/kg PO, q12h) were prescribed for 5 days. In addition, a physiotherapy regimen consisting of gentle stretching exercises using a toy or chewing treat, together with massage of the masticatory muscles, was recommended to the owners to facilitate recovery and improve mandibular mobility.

Postoperative follow-up was performed by routine clinical examinations on days 5 and 10 after surgery. Quantitative measurement of maximum mouth opening could not be performed due to the retrospective nature of the study and because standardized measurements were not routinely recorded in the clinical setting. This is acknowledged as a limitation of the study. Instead of the quantitative measurements, postoperative recovery was primarily assessed clinically and through owner observations of feeding behavior, chewing ability, and overall comfort.

Postoperative CT or radiographic imaging was not performed because it required general anesthesia, involved additional financial cost, and most owners declined further imaging once satisfactory clinical improvement was achieved. Therefore, follow-up assessment relied primarily on clinical examination and owner observations.

Follow-up telephone interviews were conducted with the owners 6 months postoperatively and again at the time of manuscript preparation to assess long-term outcomes, including appetite, food intake, and recurrence of clinical signs.

Assessment of the Outcome

Outcome categories (excellent, good, fair, poor) were assigned based on postoperative mandibular mobility, feeding ability, and recurrence, which is in accordance with previously described evaluation systems [5,11,18] in feline temporomandibular joint ankylosis *(Table 1)*. Owner-reported quality of life was also included in the assessment.

Results

During the defined study period, examination of medical records revealed that 13 cats underwent gap arthroplasty for the treatment of TMJ ankylosis. Three of these cats were excluded from the study due to missing medical records, leaving a total of 10 cases that met the inclusion criteria and were evaluated in this study.

The mean age of the cats was 23.3 months (range, 4-72 months). Of the 10 cats included, six were male and four were female. Among the males, four were neutered and two were intact, while among the females, two were spayed and

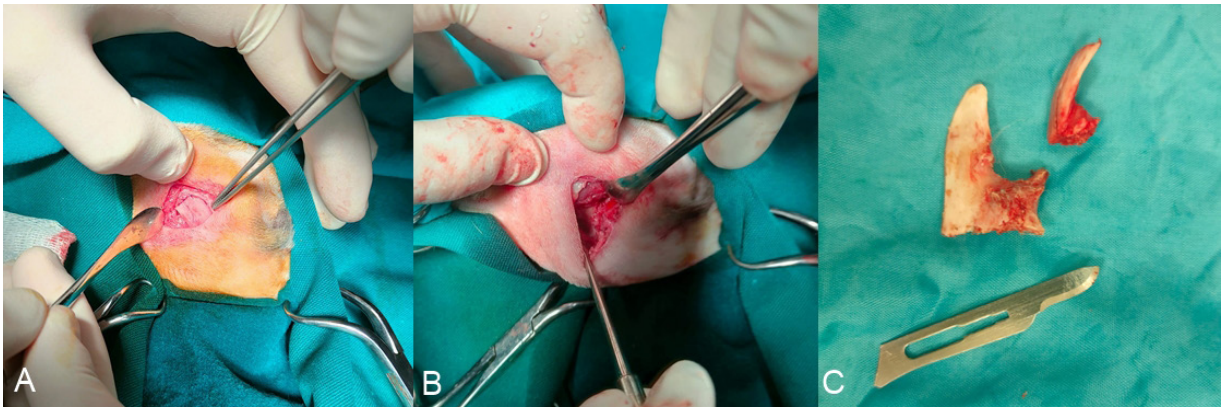

Fig 1. Intraoperative images illustrating the surgical procedure in Case 7. A: Appearance of the zygomatic arch following soft tissue retraction, B: View of the underlying soft tissues after zygomectomy, C: Resected condylar and coronoid processes removed en bloc with the zygomatic arch

Table 1. *Grading of the outcome of the GAP arthroplasty*

Outcome Grade	Criteria
Excellent	Normal feeding and grooming behaviors, acceptable mouth opening, and no recurrence or complications
Good	Near-normal function with only minor difficulties, absence of clinically relevant recurrence, and complications manageable with medical treatment
Fair	Mild-to-moderate dysfunction, such as partial dependence on soft diets or intermittent signs suggestive of recurrence
Poor	No significant improvement, or when recurrence or major complications required additional surgical intervention

two remained intact. With respect to breed distribution, the study population consisted of four Domestic Shorthair cats, four Scottish Folds, and one cat each of the British Shorthair and British Longhair breeds. The mean body weight of the patients was 2.07 kg (median, 1.8 kg; range, 1.0-3.2 kg).

Of the 10 cats included, nine had a documented history of trauma, whereas in one cat temporomandibular joint ankylosis developed in the absence of any known traumatic event. The interval between trauma and admission to clinic ranged from 15 days to 12 months, with a median of 2.25 months (mean, 3.05 months). Although the exact onset of clinical signs could not be determined in most cases, owners generally reported seeking veterinary care once complete loss of jaw mobility was observed. According to the available information, the interval between the perceived onset of complete loss of the TMJ function and presentation to the hospital varied from 3 days to 1 month. According to the medical records, in six cats at least one previous attempt to relieve the ankylosis had been performed at another clinic prior to referral. These procedures consisted of forced mouth opening under general anesthesia, sometimes combined with intra-articular injection of corticosteroids and local anesthetic agents. However, only transient improvement was achieved, and all cats subsequently developed recurrence of jaw immobility.

On clinical examination, all cats presented with severe restriction of mandibular mobility. Preoperatively, the interincisal distance was minimal, permitting only limited extension of the tongue for water or soft food intake, while normal prehension and mastication were impossible. Additional common clinical findings included hypersalivation, low body condition associated with impaired food intake, and poor grooming, particularly around the head and neck region. Furthermore, mandibular brachygnathia was noted in one cat (Case 9), and in another three cats (Case 1, 4 and 7) asymmetric malocclusion (wry bite) was observed *(Fig. 2, Fig. 3)*. Unilateral facial paralysis was also noted in one cat (Case 8).

Hematology and serum biochemistry results were heterogeneous and did not reveal a consistent pattern. Mild leukopenia and mild hypoalbuminemia were observed in five cats, while the remaining values were within reference limits.

In four cats, unilateral intra-articular ankylosis was identified, whereas in another four cats unilateral ankylosis involved both intra- and extra-articular structures *(Fig. 4)*. In two cats (Case 2 and 4), bilateral ankylosis with combined intra- and extra-articular involvement was present *(Fig. 5)*. All but one (Case 8) unilateral cases affected the left temporomandibular joint.

Among eight cats diagnosed with unilateral TMJ ankylosis, unilateral gap arthroplasty was performed in six cases. In the remaining two (Case 7 and 9), surgery was subsequently indicated for the contralateral joint because of the recurrence of the ankylosis after the initial procedure. Although no postoperative CT was available in these cases, clinical examination and deep palpation of the initial surgical site showed an enough GAP between the ostectomy lines. Depending on these signs, contralateral

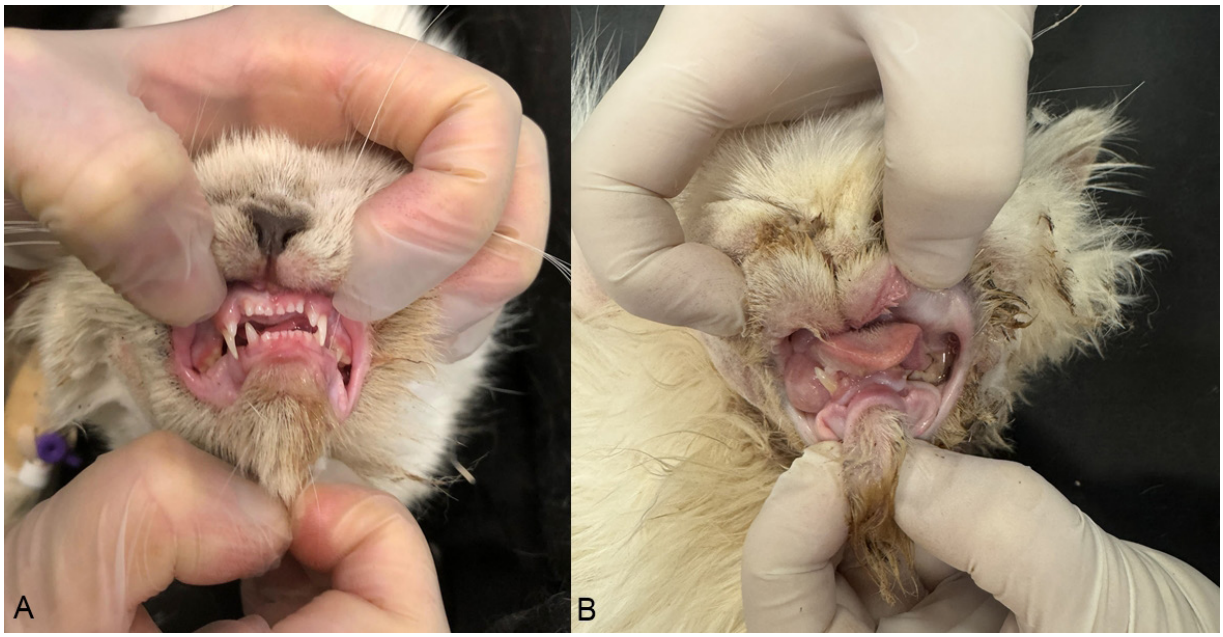

Fig 2. Clinical appearance of the assymetric malocclusion. A: Assymetric malocclusion in a Scottish Fold cat with a left shift of the mandible (Case 7), B: Assymetric malocclusion in a British Short Hair cat with a right shift of the mandible, and poor grooming is obvious around mouth and neck region (Case 4)

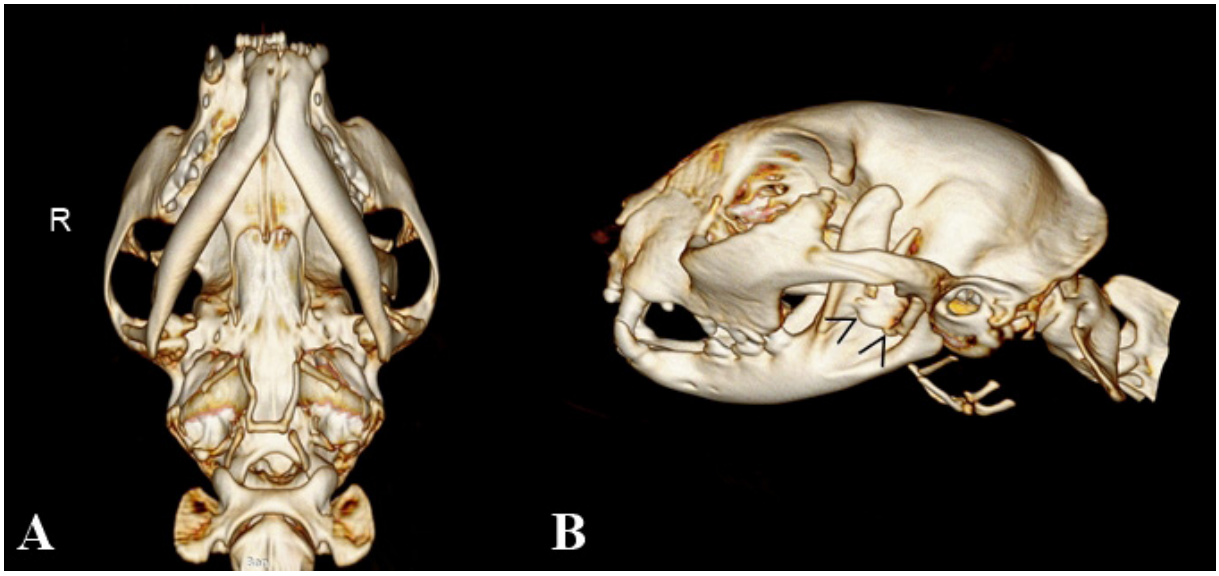

Fig 3. Three dimentional volume rendering CT images of the left side TMJ ankylosis (Case 1). A: Assymetric malloclusion (wry bite) with a left shift of mandible, B: Osseos proliferation and bridging (*arrowheads*)

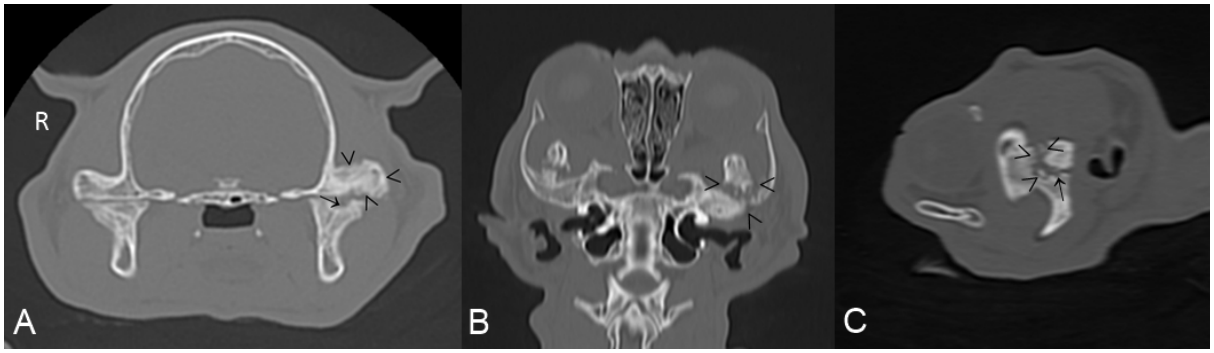

Fig 4. Transverse (A), dorsal (B) and left sagittal (C) CT images of the TMJ showing marked thickening and irregular osseous proliferation of the condylar process and mandibular fossa (*arrows and arrowheads*) (Case 3)

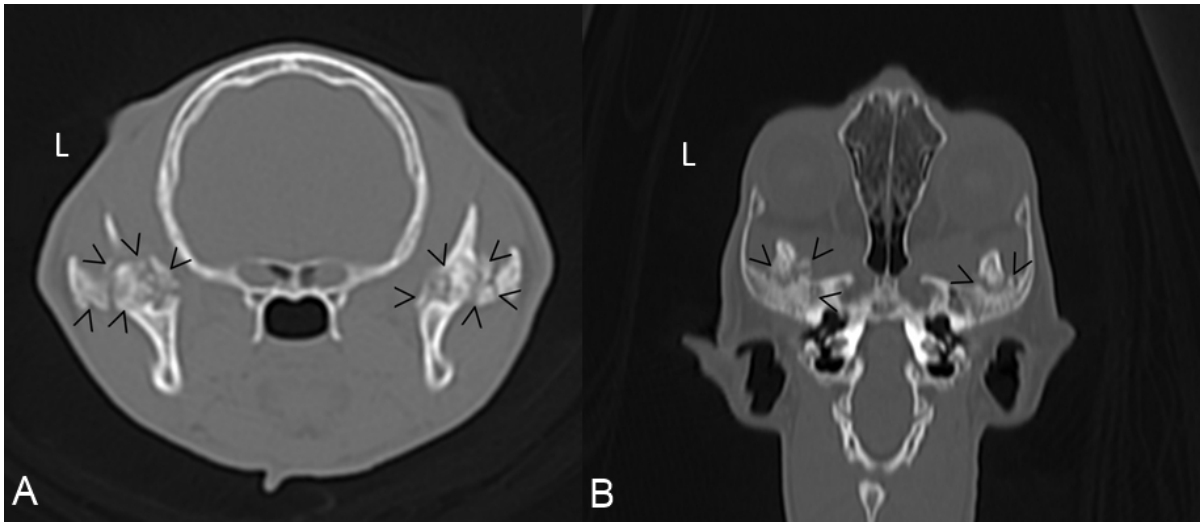

Fig 5. Transverse (A) and dorsal (B) CT images showing bilateral TMJ ankylosis (Case 4). Extensive osseous proliferation and bridging are present between the mandibular condyles and the temporal bones (*arrowheads*), resulting in loss of normal joint space and marked thickening of periarticular bone

surgery was decided. Bilateral GA in the same session was performed in 2 cats with bilateral TMJ ankylosis confirmed by CT *(Fig. 6)*.

Satisfactory range of motion at the level of TMJ was achieved in all cases immediately after GA. Suture removal was uneventful in all cats except one (Case 10), in which mild dermatitis developed due to early removal of the Elizabethan collar; the lesion resolved after two sessions of therapeutic laser treatment.

The outcome was classified as excellent in three cases (Cases 1, 2, and 4), good in four cases (Cases 3, 5, 8, and 10), and fair in one case (Case 6). In the remaining two cases (Cases 7 and 9), the initial outcome was poor following the first GA but became excellent after the contralateral procedure *(Fig. 7)*. One cat died seven months postoperatively due to panleukopenia, while the remaining nine were still alive at the time of manuscript preparation. The mean follow-up duration was 16.8 months (range, 7-33 months; median, 15 months). Detailed data of the cases is given in *Table 2*.

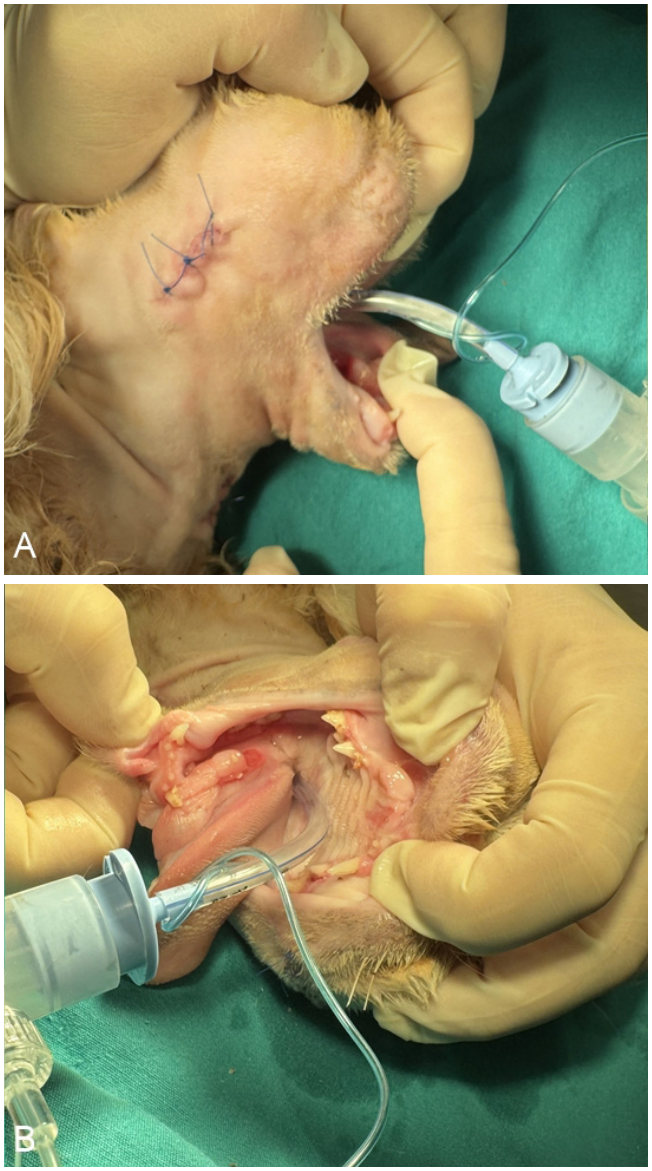

Fig 6. Immediate postoperative clinical appearance of Case 4, where bilateral gap arthroplasty was performed

Fig 7. This image, taken by the owner six months after the second gap arthroplasty, demonstrates excellent mouth opening without any functional restriction in Case 7

The quality of life (QoL) reported by the owners was assessed through follow-up telephone interviews. According to the owners, all cats showed a marked improvement in terms of living comfort. The owner of the cat with a moderate outcome (Case 6) reported only a moderate improvement in quality of life; it was learned that the cat continued to eat soft food but that its condition was stable. The owner declined further reassessment or surgical intervention. Other owners reported their cats› post-operative recovery and quality of life as good to very satisfactory.

Discussion

This retrospective study evaluated the clinical features, imaging findings, surgical management, and long-term outcomes of GA in ten cats diagnosed with TMJ ankylosis. The results demonstrated that GA effectively restored mandibular mobility and improved quality of life in most cases. These findings reaffirm that GA remains a reliable and accessible treatment for feline TMJ ankylosis, particularly in cases where functional impairment is severe and conservative management fails.

Trauma was identified as the primary cause of TMJ ankylosis in most cats, consistent with previous reports emphasizing post-traumatic etiology [8,11]. Most of the affected cats were young adults, a finding also reported by Aghashani et al. [11], likely reflecting the higher risk of accidental trauma in active cats. Also, as it is stated in the previous studies, this may be related with the higher growth rate of the young individuals which make

Table 2. *Detailed data of the cases with temporomandibular joint (TMJ) ankylosis*

No.	Signalment	History	Clinical Findings	CT Imaging Findings	Bilateral/ Unilateral	Outcome/Follow up
1	DSH, neutred male, 4 y 1.5 m, 2.8 kg	Trauma; fall from a height	TMJ ankylosis, mandibular deviation	Left extra-intra ankylosis, asymmetric malocclusion	Unilateral	Excellent/11 m
2	SF, intact male, 1 y, 1.8 kg	Trauma; fall from a height	TMJ ankylosis, gingivitis	Bilateral extra-intra ankylosis	Bilateral	Excellent/21 m
3	BLH, intact male, 1 y 10 m, 3.1 kg	Trauma; fall from a height	TMJ ankylosis, dehydration, gingivitis	Left extra-intra ankylosis	Unilateral	Good/died 7 months after op due to panleukopenia
4	BSH, intact female, 1 y, 1.7 kg	Trauma; fall from a height	TMH ankylosis, mandibular deviation	Bilateral extra-intra ankylosis, asymmetric malocclusion	Bilateral	Excellent/11 m
5	DSH, intact male, 8 m, 1.5 kg	Trauma; traffic accident	TMJ ankylosis, dehydration	Left intra ankylosis	Unilateral	Good/19 m
6	SF, neutred female, 1 y 5 m, 1.8 kg	Trauma; fall from a height	TMJ ankylosis	Left extra-intra ankylosis	Unilateral	Fair/20 m
7	SF, intact female, 5.5 m, 1 kg	Trauma; fall from a height	TMJ ankylosis, mandibular asymmetry	Left extra-intra ankylosis, asymmetric malocclusion	Bilateral/ in different sessions	Poor after 1st op, excellent after 2nd op/33 m
8	DSH, neutred female, 6y, 3.2 kg	Trauma; traffic accident	TMJ ankylosis, gingivitis, left sided facial paralyses	Right intra ankylosis	Unilateral	Good/30 m
9	SF, Female, intact, 4 m, 1 kg	Trauma; fall from a height	TMJ ankylosis, mandibular brachygnathia	Left intra ankylosis, malocclusion	Bilateral/ in different sessions	Poor after 1st op, excellent after 2nd op/7 m
10	DSH, neutred male, 3 y 7 m, 2.8 kg	Trauma; fall from a height	TMJ ankylosis	Left intra ankylosis	Unilateral	Good/9 m

BLH: British Longhair, BSH: British Shorthair, DSH: Domestic Short Hair, m: Months, op: Operation, SF: Scottish Fold, TMJ: Temporomandibular Joint, y: Year(s)

them more susceptible to ankylosis [6,10]. An interesting aspect of this study was the predominance of purebred cats including British Shorthair and Scottish Folds. Breed predisposition has not been previously reported in the veterinary literature; however, the relatively high representation of these breeds in our series may suggest anatomical or behavioral factors that could increase susceptibility to maxillofacial trauma or post-traumatic ankylosis. Although further studies with larger and genetically diverse populations are required to confirm any potential breed predisposition, these findings raise awareness of the need for vigilance in these breeds following facial trauma.

Another notable observation was that most owners recognized early signs such as difficulty eating or decreased grooming but only sought veterinary care when the mouth could no longer be opened. This delay in presentation may contribute to the progression from fibrous to bony ankylosis, as previously suggested [6,8,18]. Early recognition and imaging are therefore critical to prevent complete ossification and improve surgical outcomes.

In six cats, there was a history of prior attempted jaw manipulation under general anesthesia at other veterinary centers. These procedures involved forceful opening of the mouth to restore motion, but only transient improvement was achieved, and all cats later presented with recurrence and more severe restriction. Similar cases have been reported by Maas and Theyse [5], who warned that forceful manipulation of ankylosed jaw joints may exacerbate intra-articular trauma and fibrosis, thereby worsening the condition. Later studies have also reported recurrence after unsuccessful conservative interventions [11,18]. The current findings support these concerns and highlight the need for accurate imaging and appropriate surgical planning rather than non-specific manual interventions.

Unilateral involvement was more common than bilateral, as also observed in other studies [10,11]. However, in the present series, nearly all unilateral cases affected the left TMJ, a distribution not previously emphasized in the literature. This may be related to the direction of traumatic forces, or it may be due to random variation within the small cohort. Further studies involving larger populations are needed to determine whether there is a biomechanical or behavioral basis for laterality in feline TMJ pathology.

Gap arthroplasty restored immediate postoperative mouth opening in all cats, which aligns with previous studies showing rapid functional recovery after removal of ankylotic bone bridges and degenerated joint [10,11,18]. Ankylosis recurred in two cats, and clinical examination determined that it most likely developed on the contralateral side. Clinical signs completely resolved following contralateral surgical intervention. This finding reflects observations in other reports suggesting that bilateral involvement may initially be subclinical and subsequently manifest as contralateral ankylosis [18]. These findings emphasize the importance of detailed preoperative CT evaluation to detect even the slightest changes in the contralateral joint.

The use of piezoelectric bone cutting devices in feline TMJ arthroplasty allows for precise osteotomy near critical neurovascular structures [11,25]. Although previous studies have emphasized the accuracy and improved visibility of these devices [26], traditional instruments such as osteotomes, mallets and rongeurs were successfully used in this study. While piezo surgery provides minimally traumatic cutting, it requires specialized equipment that is not always available in clinical settings. The positive outcomes in this series demonstrate that traditional instruments remain a practical and cost-effective alternative when careful technique and visualization are ensured.

Postoperative physiotherapy and early functional use of the mandible are crucial for functional recovery following temporomandibular joint surgery in cats, in addition to preventing fibrosis and recurrence [5,11,14,24]. In the current study, owners were instructed to perform gentle stretching and encourage chewing activity using toys or chewing treats. Although adherence was not objectively monitored, the low recurrence rate suggests that even simple, consistent exercises can contribute to favorable outcomes.

Although gap arthroplasty remains the most widely described surgical technique for the management of feline TMJ ankylosis, other procedures such as interpositional arthroplasty (IA) and segmental mandibulectomy (SM) have been proposed to reduce the likelihood of recurrence. In a retrospective study of Kocsis et al. [18] found that interpositional arthroplasty (IA) was advantageous compared with gap arthroplasty (GA) and segmental mandibulectomy (SM). The use of autologous fat grafts in interpositional arthroplasty (IA) has attracted attention due to their excellent biocompatibility and cushioning effects, and they function as biological spacers to reduce the risk of re-ankylosis. However, long-term outcomes remain uncertain due to potential fat resorption and fibrosis. As in this study, fat harvesting may be difficult in cats with poor body condition, and additional manipulation may increase surgical stress and the risk of infection. IA also prolongs the duration of surgery and increases the risk of postoperative inflammation compared to GA. Therefore, while GA remains the most practical option for advanced cases, IA may be considered for recurrent cases once the general condition and body weight have improved.

Complications were rare in the present series. Only one cat developed postoperative mild dermatitis due to early removal of the Elizabethan collar, which was resolved with therapeutic laser sessions. No major perioperative or postoperative complications such as hemorrhage, infection, or facial nerve damage occurred. Although two cases required contralateral surgery, this was not considered a postoperative complication. It was presumed to result from subtle pre-existing changes in the opposite joint that were not detectable on the initial CT scan. This compares favorably with previous reports, in which postoperative complications such as mandibular deviation, malocclusion, or fibrotic relapse were occasionally observed [5,11]. The limited lateral mandibular movement characteristic of feline TMJ anatomy may reduce the risk of postoperative asymmetry.

Long-term follow-up (mean = 16.8 months) confirmed sustained functional improvement in all surviving cats. Owner-reported quality of life was markedly improved in nearly all cases, consistent with the functional classifications proposed by Aghashani et al. [11] and Kocsis et al. [18]. Only one owner reported moderate improvement, with the cat continuing to eat soft food. These subjective findings provide valuable complementary data to clinical assessment, reflecting the true impact of surgery on daily behavior and welfare.

The main limitations of this study include the absence of quantitative measurement of mouth opening, the retrospective design, and the limited number of cases. Nevertheless, the consistency of improvement across cases, the relatively long follow-up period, and the inclusion of different breeds strengthen the reliability of the findings. Overall, this study supports GA as an effective, accessible, and low-risk procedure for restoring jaw function in cats with TMJ ankylosis.

Another limitation of the present study was the absence of postoperative imaging, primarily due to the need for general anesthesia and the associated financial constraints faced by most owners. Although postoperative computed tomography would have provided objective confirmation of the surgical gap and assessment of bone remodeling, it was not feasible under these conditions. Follow-up radiographs were also considered; however, deep sedation or anesthesia would still have been required to obtain diagnostic-quality images. Also, most of the owners were unwilling to admit their cats once the favorable

improvement was achieved. Consequently, postoperative evaluation relied mainly on clinical examination and owner-reported functional improvement. Despite this limitation, the consistent recovery of mandibular motion and the absence of clinical recurrence in most cases suggest that the outcomes were accurately reflected by the functional assessments performed.

In conclusion, gap arthroplasty has effectively restored mandibular function and improved quality of life in cats with TMJ ankylosis. When meticulous dissection and visualization are ensured, this procedure can be performed safely and successfully using conventional instruments. The findings emphasize the importance of early diagnosis and appropriate referral, particularly in cases involving delayed presentation or prior unsuccessful interventions. Long-term outcomes were favorable, with recurrence limited to cases requiring contralateral surgery. GA remains a practical and reliable treatment option for TMJ ankylosis in cats.

Declarations

Availability of Data and Materials: The data that support the findings of this study are available on request from the corresponding author (P. Can).

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Conflict of Interest: The authors declare that there is no conflict of interest.

Declaration of Generative Artificial Intelligence (AI): The authors declare that the article, tables and figures were not written/created by AI and AI-assisted Technologies.

Authors' Contributions: PC designed the study, examined the cases, evaluated the CT images, performed the surgeries, reviewed the patients' database and wrote the original draft. EU reviewed the patients' database, examined the cases, and performed the surgeries. RE examined the cases, assisted the surgeries, collected the follow-up data. All authors reviewed and approved the final version of the manuscript.

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