

EVIDENCE SUMMARY

Wrist Ganglia

title: "Wrist Ganglia" slug: wrist-ganglia region: wrist audience: patient mesh_terms: ["Ganglion Cysts", "Wrist Joint", "Wrist", "Synovial Cyst", "Wrist Injuries", "Carpal Bones", "Bone Cysts", "Recurrence"] article_count: 134 model_used: Qwen3.6-35B-A3B-Q8_0.gguf generated_at: '2026-06-16T19:32:06+00:00' key_articles: - title: "Arthroscopic Excision of Dorsal Wrist Ganglion: Factors Related to Recurrence and Postoperative Residual Pain" ref_num: 1 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.arthro.2013.04.002 year: 2013 - title: "Wrist Ganglion Cysts in Children: An Update and Review of the Literature" ref_num: 2 evidence_tier: paper evidence_level: 4 doi: 10.1177/1558944720966716 year: 2020 - title: "Pediatric Ganglions of the Hand and Wrist: A Review of Current Literature" ref_num: 3 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2021.12.015 year: 2022 - title: "Sonography-Assisted Arthroscopic Resection of Volar Wrist Ganglia: A New Technique" ref_num: 4 evidence_tier: paper doi: 10.1016/j.eats.2011.12.007 year: 2012 - title: "Arthroscopic resection of dorsal wrist ganglions with or without midcarpal exploration" ref_num: 5 evidence_tier: paper evidence_level: 3 doi: 10.1177/17531934251405730 year: 2025 - title: "Recurrence Rates of Dorsal Wrist Ganglion Cysts After Arthroscopic Versus Open Surgical Excision: A Retrospective Comparison" ref_num: 6 evidence_tier: paper evidence_level: 3 doi: 10.1177/15589447211003184 year: 2021 - title: "Clinical Presentation and Characteristics of Hand and Wrist Ganglion Cysts in Children" ref_num: 7 evidence_tier: paper evidence_level: 2 doi: 10.1016/j.jhsa.2021.02.026 year: 2021 - title: "Patient outcomes following wrist ganglion excision surgery" ref_num: 8 evidence_tier: paper evidence_level: 4 doi: 10.1177/1753193411434376 year: 2012 - title: "Arthroscopic Resection of Dorsal Wrist Ganglion: Results and Rate of Recurrence Over a Minimum Follow-up of 4 Years" ref_num: 9 evidence_tier: paper evidence_level: 4 doi: 10.1177/1558944717743601 year: 2017 - title: "Incidence and Risk Factors for Volar Wrist Ganglia in the U.S. Military and Civilian Populations" ref_num: 10 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2016.08.008 year: 2016 - title: "Epidemiology of Symptomatic Dorsal Wrist Ganglia in Active Duty Military and Civilian Populations" ref_num: 11 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsg.2020.08.001 year: 2020 - title: "Outcomes of Open Dorsal Wrist Ganglion Excision in Active-Duty Military Personnel" ref_num: 12 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2015.05.030 year: 2015 - title: "Carpal Coalitions on Radiographs: Prevalence and Association With Ordering Indication" ref_num: 13 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2017.02.002 year: 2017 - title: "Evaluation of Ulnar-sided Wrist Pain" ref_num: 14 evidence_tier: paper evidence_level: 5 doi: 10.5435/jaaos-d-16-00407 year: 2017 - title: "Wrist Ganglion Treatment: Systematic Review and Meta-Analysis" ref_num: 15 evidence_tier: paper evidence_level: 1 doi: 10.1016/j.jhsa.2014.12.014 year: 2015 - title: "Wrist Ganglia in Children: Nonsurgical Versus Surgical Treatment" ref_num: 16 evidence_tier: paper evidence_level: 4 doi:

10.1016/j.jhsa.2019.10.032 year: 2020 - title: "Arthroscopic Ganglionectomy Through an Intrafocal Cystic Portal for Wrist Ganglia" ref_num: 17 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.arthro.2009.08.021 year: 2010 - title: "Arthroscopic resection of occult dorsal wrist ganglia" ref_num: 18 evidence_tier: paper evidence_level: 4 doi: 10.1007/s00402-016-2539-0 year: 2016 - title: "Arthroscopic Resection of Dorsal Wrist Ganglia and Treatment of Recurrences" ref_num: 20 evidence_tier: paper evidence_level: 4 doi: 10.1054/jhsb.1999.0290 year: 2000 - title: "Is there still a place for denervation in the treatment of osteoarthritis of the wrist and hand?" ref_num: 21 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.otsr.2021.102986 year: 2021 - title: "Midterm results of arthroscopic treatment of scapholunate ligament lesions associated with intra-articular distal radius fractures" ref_num: 22 evidence_tier: paper evidence_level: 4 doi: 10.1007/s001670050172 year: 1999 - title: "Dynamic wrist imaging using four-dimensional CT: current concepts, clinical applications, and future perspectives" ref_num: 25 evidence_tier: paper evidence_level: 5 doi: 10.1530/eor-2026-0051 year: 2026 - title: "Carpal Instability" ref_num: 28 evidence_tier: paper evidence_level: 5 doi: 10.2106/00004623-199503000-00019 year: 1995 - title: "The Utility of High-Resolution Magnetic Resonance Imaging in the Evaluation of the Triangular Fibrocartilage Complex of the Wrist*" ref_num: 32 evidence_tier: paper evidence_level: 2 doi: 10.2106/00004623-199711000-00009 year: 1997 - title: "Carpal Ligaments" ref_num: 33 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.hcl.2017.04.007 year: 2017 - title: "Abnormal MRI signal intensity of the triangular fibrocartilage complex in asymptomatic wrists" ref_num: 34 evidence_tier: paper evidence_level: 3 doi: 10.1177/17531934221141986 year: 2022 - title: "In Vivo Changes in Contact Regions of the Radiocarpal Joint During Wrist Hyperextension" ref_num: 35 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2012.08.030 year: 2012 - title: "Automated detection of wrist ganglia in MRI using convolutional neural networks" ref_num: 36 evidence_tier: paper evidence_level: 4 doi: 10.1186/s12891-025-09011-1 year: 2025 - title: "The Liebenberg syndrome: in depth analysis of the original family" ref_num: 37 evidence_tier: paper evidence_level: 4 doi: 10.1177/1753193413502162 year: 2013 - title: "Intraosseous Ganglion Cysts of the Carpus: Current Practice" ref_num: 40 evidence_tier: paper evidence_level: 4 doi: 10.1007/s11552-015-9750-2 year: 2015 - title: "Cystic soft tissue tumours of the dorsal aspect of the wrist have two distinct histological subtypes" ref_num: 41 evidence_tier: paper evidence_level: 4 doi: 10.1177/17531934241251721 year: 2024 synthesis_version: "v2" verifier_status: skipped

Overview

- Female patients with preoperative pain around dorsal wrist ganglia are the most likely to have residual pain after surgery [1].
- There is no consensus within the literature regarding the best management of pediatric wrist ganglia [2].
- No single treatment modality confers a particular advantage or disadvantage over another for pediatric wrist ganglia [2].
- Sonography-assisted arthroscopic resection is safer and more reliable for treating volar wrist ganglia [4].
- Routine midcarpal joint exploration during arthroscopic excision of dorsal wrist ganglions appears to reduce recurrence at 1 year without negatively impacting patient outcomes [5].
- Open excision of dorsal wrist ganglia leads to a lower recurrence rate than arthroscopic excision [6].

- Surgical excision of primary wrist ganglia significantly reduces patient symptoms with low recurrence rates and high patient satisfaction [8].
- Outcomes, recurrence, and complication rates after 4 years of follow-up support the use of arthroscopy as a treatment for dorsal wrist ganglion [9].
- Patients whose occupation or activities require forceful wrist extension should be counseled on the considerable risk of residual pain and functional limitations that may occur after open dorsal wrist ganglion excision [12].
- Open surgical excision offers a significantly lower chance of recurrence compared with aspiration in the treatment of wrist ganglions [15].
- Arthroscopic ganglionectomy through an intrafocal cystic portal is a safe and efficacious option for the treatment of painful wrist ganglia [17].
- High patient satisfaction can be achieved for arthroscopic treatment of occult dorsal wrist ganglia [18].
- Arthroscopic treatment of a dorsal wrist ganglion is a good alternative to open surgery, though it is a difficult procedure requiring adequate experience [20].

Anatomy & Pathophysiology

- Sonography-assisted arthroscopic resection is a safer and more reliable technique for treating volar wrist ganglia [4].
- Determining the etiology of ulnar-sided wrist pain is challenging due to overlapping history and physical examination findings [14].
- Diagnosis of ulnar-sided wrist pain requires a detailed history, systematic physical examination with provocative maneuvers, and appropriate diagnostic imaging [14].
- Four-dimensional CT complements conventional imaging and arthroscopy by providing functional information on wrist biomechanics [25].
- Four-dimensional CT should be used selectively when dynamic instability is suspected and conventional imaging is inconclusive [25].
- The radioscapholunate fusion shows the most biomechanically similar behavior to the healthy wrist among compared fusion types [26].
- The scaphoid, lunate, and capitate move synergistically throughout planar wrist motion [27].
- The row theory more clearly accounts for the function of the wrist than the column theory regarding carpal instability [28].
- Carpal instability is a multifactorial phenomenon involving inadequate wrist proprioception, poor interaction between ligaments and muscles, and lack of control by the sensorimotor system [33].
- Combined wrist hyperextension with radial deviation causes the scaphoid to contact the radius over the radial styloid [35].
- Anatomical differences in Liebenberg syndrome are biomechanically normal for the individual, resulting in near-normal function and painless joints [37].

Classification

- Female patients with preoperative pain around dorsal wrist ganglia are the most likely to have residual pain after surgery [1].
- There is no consensus within the literature regarding the best management of pediatric wrist ganglia [2].
- No single treatment modality confers a particular advantage or disadvantage over another for pediatric wrist ganglia [2].
- In children aged <10 years, ganglions mainly occur on the volar wrist [3].
- 69% to 79% of pediatric ganglions in children aged <10 years display spontaneous regression within a span of 12-18 months [3].
- Sonography-assisted arthroscopic resection is considered safer and more reliable for treating volar wrist ganglia [4].
- Open excision of dorsal wrist ganglia leads to a lower recurrence rate than arthroscopic excision [6].
- Ganglions in pediatric populations most commonly affect the dorsal wrist [7].
- Pediatric ganglions demonstrate a female predilection [7].
- Military service members have higher rates of volar wrist ganglia diagnoses than their age- and sex-matched civilian counterparts [10].
- The incidence of dorsal wrist ganglia was higher in the military compared with the civilian population [11].
- Clinicians should be careful ascribing symptoms to anatomical variations on radiographs in patients with nonspecific wrist pain [13].
- Open surgical excision offers a significantly lower chance of recurrence compared with aspiration in the treatment of wrist ganglions [15].
- Joint denervation is a symptomatic treatment for osteoarthritis of the wrist and hand [21].
- Cystic soft tissue tumours of the dorsal aspect of the wrist have two distinct histological subtypes [41].
- Both histologically distinct tissue types coexist at recurrence in dorsal wrist ganglia [41].
- There are equal recurrence rates in both initial synovial and ganglion groups for dorsal wrist cystic soft tissue tumours [41].

Clinical Presentation

- Female patients with preoperative pain around dorsal wrist ganglia are the most likely to have residual pain after surgery [1].
- Pediatric wrist ganglions most commonly affect the dorsal wrist and demonstrate a female predilection [7].
- In children aged <10 years, ganglions mainly occur on the volar wrist [3].
- Ganglions in children usually resolve within 18 months if they resolve spontaneously [16].

- Military service members have higher rates of volar wrist ganglia diagnoses than their age- and sex-matched civilian counterparts [10].
- The incidence of dorsal wrist ganglia is higher in the military compared with the civilian population [11].
- Patients whose occupation or activities require forceful wrist extension face a considerable risk of residual pain and functional limitations after open dorsal wrist ganglion excision [12].
- Clinicians should be careful ascribing symptoms to anatomical variations on radiographs in patients with nonspecific wrist pain [13].
- Determining the etiology of ulnar-sided wrist pain is often challenging due to overlapping history and physical examination findings [14].

Investigations

- Female patients with preoperative pain around dorsal wrist ganglia are the most likely to have residual pain after arthroscopic excision [1].
- There is no consensus within the literature regarding the best management of pediatric wrist ganglia [2].
- No single treatment modality confers a particular advantage or disadvantage over another for pediatric wrist ganglia [2].
- In children aged <10 years, ganglions mainly occur on the volar wrist [3].
- In children aged <10 years, 69% to 79% of volar wrist ganglions display spontaneous regression within a span of 12-18 months [3].
- Sonography-assisted arthroscopic resection is considered safer and more reliable for treating volar wrist ganglia [4].
- Routine midcarpal joint exploration during arthroscopic excision of dorsal wrist ganglions appeared to reduce recurrence at 1 year [5].
- Routine midcarpal joint exploration during arthroscopic excision of dorsal wrist ganglions did not negatively impact patient outcomes [5].
- Ganglions in pediatric populations most commonly affect the dorsal wrist [7].
- Ganglions in pediatric populations demonstrate a female predilection [7].
- Military service members have higher rates of volar wrist ganglia diagnoses than their age- and sex-matched civilian counterparts [10].
- The incidence of dorsal wrist ganglia was higher in the military compared with the civilian population [11].
- Clinicians should be careful ascribing symptoms to anatomical variations on radiographs in patients with nonspecific wrist pain [13].
- Determining the etiology of ulnar-sided wrist pain is often challenging due to overlapping history and physical examination findings [14].
- A detailed history, systematic physical examination with provocative maneuvers, and appropriate diagnostic imaging are essential for diagnosing ulnar-sided wrist pain [14].

- If a pediatric wrist ganglion resolves, it usually does so within 18 months [16].
- Radiological evaluation showed normal radiocarpal angles, volar tilt, and radial length in patients treated arthroscopically for scapholunate ligament lesions associated with intra-articular distal radius fractures [22].
- When the appropriate pulse sequence is used, magnetic resonance imaging is an accurate and effective method for the non-invasive evaluation of pain in the wrist [32].
- For young subjects, MRI is valuable in diagnosing ulnar detachment of the triangular fibrocartilage complex [34].
- The ability to distinguish between proximal and distal laminae of the triangular fibrocartilage complex using MRI remains questionable for young subjects [34].
- Convolutional neural networks can detect ganglion cysts in wrist MRI [36].
- Intraosseous carpal bone cysts are a rare cause of chronic wrist pain that can progress to pathological fracture and tendon compromise [40].
- Once identified, intraosseous carpal bone cysts require careful clinical and radiographic assessment [40].
- Surgical intervention is indicated for symptomatic intraosseous carpal bone cysts [40].

Treatment

NON-OPERATIVE MANAGEMENT

- In children aged <10 years, volar wrist ganglions can be treated expectantly, with 69% to 79% displaying spontaneous regression within 12-18 months [3].
- There is no consensus within the literature regarding the best management of pediatric wrist ganglia, and no single treatment modality confers a particular advantage or disadvantage over another [2].

SURGICAL EXCISION: OPEN VS. ARTHROSCOPIC VS. ASPIRATION

- Open surgical excision offers a significantly lower chance of recurrence compared with aspiration in the treatment of wrist ganglions [15].
- Open excision of dorsal wrist ganglia leads to a lower recurrence rate than does arthroscopic excision [6].
- Arthroscopic treatment of a dorsal wrist ganglion is a good alternative to open surgery, though it is a difficult procedure requiring adequate experience [20].
- Arthroscopic resection of dorsal wrist ganglions with or without midcarpal exploration supports the use of arthroscopy as a treatment for dorsal wrist ganglion with favorable outcomes, recurrence, and complication rates at 4 years of follow-up [9].
- Arthroscopic ganglionectomy through an intrafocal cystic portal is a safe and efficacious option for the treatment of painful wrist ganglia [17].
- High patient satisfaction can be achieved for arthroscopic treatment of occult dorsal wrist ganglia [18].

- Sonography-assisted arthroscopic resection is a safer and more reliable method for treating volar wrist ganglia [4].
- Surgical excision of primary wrist ganglia significantly reduces patient symptoms with low recurrence rates and high patient satisfaction [8].

RECURRENCE AND TECHNICAL CONSIDERATIONS

- Routine midcarpal joint exploration during arthroscopic excision of dorsal wrist ganglions appears to reduce recurrence at 1 year without negatively impacting patient outcomes [5].

PATIENT-SPECIFIC FACTORS AND OUTCOMES

- Female patients who have preoperative pain around dorsal wrist ganglia were the most likely to have residual pain after surgery [1].
- Patients whose occupation or activities require forceful wrist extension should be counseled on the considerable risk of residual pain and functional limitations that may occur after open dorsal wrist ganglion excision [12].

Complications

- Female patients with preoperative pain around dorsal wrist ganglia are the most likely to have residual pain after surgery [1].
- Patients whose occupation or activities require forceful wrist extension should be counseled on the considerable risk of residual pain and functional limitations that may occur after open dorsal wrist ganglion excision [12].
- Routine midcarpal joint exploration during arthroscopic excision of dorsal wrist ganglions appeared to reduce recurrence at 1 year without negatively impacting patient outcomes [5].
- Open excision of dorsal wrist ganglia leads to a lower recurrence rate than does arthroscopic excision [6].
- Surgical excision of primary wrist ganglia significantly reduces patient symptoms with low recurrence rates and high patient satisfaction [8].
- The outcomes, recurrence, and complications rates after 4 years of follow-up support the use of arthroscopy as a treatment for dorsal wrist ganglion [9].

Recovery

- Female patients with preoperative pain around dorsal wrist ganglia are the most likely to have residual pain after surgery [1].
- There is no consensus within the literature regarding the best management of pediatric wrist ganglia [2].
- No single treatment modality confers a particular advantage or disadvantage over another for pediatric wrist ganglia [2].

- In children aged <10 years, ganglions mainly occur on the volar wrist [3].
- Ganglions in children aged <10 years can be treated expectantly [3].
- 69% to 79% of ganglions in children aged <10 years display spontaneous regression within a span of 12-18 months [3].
- Routine midcarpal joint exploration during arthroscopic excision of dorsal wrist ganglions appeared to reduce recurrence at 1 year without negatively impacting patient outcomes [5].
- Open excision of dorsal wrist ganglia leads to a lower recurrence rate than does arthroscopic excision [6].
- Surgical excision of primary wrist ganglia significantly reduces patient symptoms [8].
- Surgical excision of primary wrist ganglia is associated with low recurrence rates [8].
- Surgical excision of primary wrist ganglia is associated with high patient satisfaction [8].
- Outcomes, recurrence, and complications rates after 4 years of follow-up support the use of arthroscopy as a treatment for dorsal wrist ganglion [9].
- Military service members have higher rates of volar wrist ganglia diagnoses than their age- and sex-matched civilian counterparts [10].
- The incidence of dorsal wrist ganglia was higher in the military compared with the civilian population [11].
- Patients whose occupation or activities require forceful wrist extension should be counseled on the considerable risk of residual pain and functional limitations that may occur after open dorsal wrist ganglion excision [12].
- Open surgical excision offers a significantly lower chance of recurrence compared with aspiration in the treatment of wrist ganglions [15].

Key Evidence

- [L4] Female patients who have preoperative pain around dorsal wrist ganglia were the most likely to have residual pain after surgery. ([10.1016/j.arthro.2013.04.002](#))
- [L4] There is no consensus within the literature regarding the best management of pediatric wrist ganglia, and no single treatment modality confers a particular advantage or disadvantage over another. ([10.1177/1558944720966716](#))
- [L4] In children aged <10 years, ganglions mainly occur on the volar wrist and can be treated expectantly, with 69% to 79% displaying spontaneous regression within a span of 12-18 months. ([10.1016/j.jhsa.2021.12.015](#))
- [Paper] This method is safer and more reliable for treating volar wrist ganglia. ([10.1016/j.eats.2011.12.007](#))
- [L3] Routine midcarpal joint exploration during arthroscopic excision of dorsal wrist ganglions appeared to reduce recurrence at 1 year without negatively impacting patient outcomes. ([10.1177/17531934251405730](#))
- [L3] This study suggests that open excision of dorsal wrist ganglia leads to a lower recurrence rate than does arthroscopic excision. ([10.1177/15589447211003184](#))

- [L2] Ganglions in pediatric populations, which most commonly affect the dorsal wrist, demonstrate a female predilection. ([10.1016/j.jhsa.2021.02.026](#))
- [L4] Surgical excision of primary wrist ganglia significantly reduces patient symptoms with low recurrence rates and high patient satisfaction. ([10.1177/1753193411434376](#))
- [L4] The outcomes, recurrence, and complications rates after 4 years of follow-up presented in this study support the use of arthroscopy as a treatment for dorsal wrist ganglion. ([10.1177/1558944717743601](#))
- [L3] Military service members have higher rates of volar wrist ganglia diagnoses than their age- and sex-matched civilian counterparts. ([10.1016/j.jhsa.2016.08.008](#))
- [L3] The incidence of dorsal wrist ganglia was higher in the military compared with the civilian population. ([10.1016/j.jhsg.2020.08.001](#))
- [L4] Patients whose occupation or activities require forceful wrist extension should be counseled on the considerable risk of residual pain and functional limitations that may occur after open dorsal wrist ganglion excision. ([10.1016/j.jhsa.2015.05.030](#))
- [L3] Clinicians should be careful ascribing symptoms to anatomical variations on radiographs in patients with nonspecific wrist pain. ([10.1016/j.jhsa.2017.02.002](#))
- [L5] Determining the etiology of ulnar-sided wrist pain is often challenging due to overlapping history and physical examination findings; a detailed history, systematic physical examination with provocative maneuvers, and appropriate diagnostic imaging are essential for diagnosis. ([10.5435/jaao-d-16-00407](#))
- [L1] Open surgical excision offers significantly lower chance of recurrence compared with aspiration in the treatment of wrist ganglions. ([10.1016/j.jhsa.2014.12.014](#))
- [L4] In a child with a wrist ganglion, if the cyst ultimately resolved, it usually did so within 18 months. ([10.1016/j.jhsa.2019.10.032](#))
- [L4] Arthroscopic ganglionectomy through an intrafocal cystic portal is a safe and efficacious option for the treatment of painful wrist ganglia. ([10.1016/j.arthro.2009.08.021](#))
- [L4] The results confirm that high patient satisfaction can be achieved for arthroscopic treatment of occult dorsal wrist ganglia. ([10.1007/s00402-016-2539-0](#))
- [L4] Arthroscopic treatment of a dorsal wrist ganglion is a good alternative to open surgery, though it is a difficult procedure requiring adequate experience. ([10.1054/jhsb.1999.0290](#))
- [L5] Joint denervation deserves a place of choice in the surgical arsenal for osteoarthritis of the wrist and hand, provided new anatomical observations are integrated, the procedure is meticulous, and patients are informed that it is a symptomatic treatment. ([10.1016/j.otsr.2021.102986](#))
- [L4] Radiological evaluation showed normal radiocarpal angles, volar tilt, and radial length in all patients. ([10.1007/s001670050172](#))
- [L5] Four-dimensional CT complements conventional imaging and arthroscopy by providing functional information on wrist biomechanics and should be used selectively when dynamic instability is suspected and conventional imaging is inconclusive. ([10.1530/eor-2026-0051](#))

- [L5] The article summarizes current thinking regarding the diagnosis and treatment of clinically important carpal instabilities, emphasizing that the row theory more clearly accounts for the function of the wrist than the column theory. ([10.2106/00004623-199503000-00019](https://doi.org/10.2106/00004623-199503000-00019))
- [L2] When the appropriate pulse sequence is used, magnetic resonance imaging is an accurate and effective method for the non-invasive evaluation of pain in the wrist. ([10.2106/00004623-199711000-00009](https://doi.org/10.2106/00004623-199711000-00009))
- [L5] Carpal instability is a multifactorial phenomenon involving inadequate wrist proprioception, poor interaction between ligaments and muscles, and lack of control of the entire process by the sensorimotor system. ([10.1016/j.hcl.2017.04.007](https://doi.org/10.1016/j.hcl.2017.04.007))
- [L3] For young subjects, MRI is still valuable, especially in diagnosing ulnar detachment, although the ability to distinguish between proximal and distal laminae remains questionable. ([10.1177/17531934221141986](https://doi.org/10.1177/17531934221141986))
- [L4] Combined wrist hyperextension with radial deviation caused the scaphoid to contact the radius over the radial styloid. ([10.1016/j.jhsa.2012.08.030](https://doi.org/10.1016/j.jhsa.2012.08.030))
- [L4] CNMs can detect ganglion cysts in wrist MRI. ([10.1186/s12891-025-09011-1](https://doi.org/10.1186/s12891-025-09011-1))
- [L4] Conservative management is the guiding principle as the anatomical differences are biomechanically normal for the individual, resulting in near-normal function and painless joints. ([10.1177/1753193413502162](https://doi.org/10.1177/1753193413502162))
- [L4] Intraosseous carpal bone cysts are a rare cause of chronic wrist pain that can progress to pathological fracture and tendon compromise; once identified, they require careful clinical and radiographic assessment with surgical intervention indicated for symptomatic cases. ([10.1007/s11552-015-9750-2](https://doi.org/10.1007/s11552-015-9750-2))
- [L4] The study demonstrated two histologically distinct tissue types at primary surgery and the coexistence of both tissue types at recurrence, with equal recurrence rates in both initial synovial and ganglion groups. ([10.1177/17531934241251721](https://doi.org/10.1177/17531934241251721))

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