

BASAL JOINT ARTHROSCOPY INDICATIONS AND STT JOINT ARTHROPLASTY

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SUMMARY

Purpose: Basal joint arthroscopy and STT joint arthroplasties are of the more recent evolutions of small joints arthroscopy. We report our experience in these innovative procedures. **Methods:** Classical material is generally sufficient to perform these procedures without any specific adaptation. Arthroscopic exploration of the trapeziometacarpal articulation is performed through 1R and 1U portals and STT joint with Radio-midcarpal (RMC) and STT portals. For basal joint, we can distinguish diagnosis and therapeutic indications. Diagnosis indications: post-traumatic painful basal joint assessment, extend of chondromalacia... Therapeutic indications: Bennett's fractures, dislocations, painful hyperlaxity, partial trapeziectomy (+/- ligamentoplasty, interposition) ... For SST chondromalacia, resection-arthroplasty can be performed with or without interposition. **Results:** First results of these recent procedures seems to be encouraging with very few complications but they must be validated with prospective larger series. **Conclusions:** Peri-trapezium joints appear to be the field of recent arthroscopic procedures with clinical results at least as effective as classical open surgery. Riv Chir Mano 2006; 3: 383-388

KEY WORDS

Trapeziometacarpal joint, arthroscopy, STT joint

HISTORICAL DEVELOPMENTS

Firsts small joints arthroscopies in cadavers have been described by M Watanabe (1) in his atlas and other publications (2) but with no specific exploration of the trapeziometacarpal and STT joints. Arthroscopy of the wrist (portals, technique, indications) has been perfectly described by Terry Whipple (since 1985) (3) and is actually considered as the gold standard diagnosis exploration of the wrist and its therapeutic interest is largely validated for a lot of mini invasive procedures (4). STT joint arthroscopic arthroplasty has been presented by D Fontès in 1996 during the annual meeting of the French society of hand surgery and several authors were interested in the development of Basal Joint exploration: RA Berger (5), MA

Orellana & J Chow (6), J Menon (7) , EF Walsh (8), A Badia (9), D Fontès (4).

SURGICAL ANATOMY

These procedures require an axial traction (10) to enlarge the articular working space applied directly on the thumb for basal joint (Fig. 1) and on the thumb and index for STT joint. The use of a specific traction device is ideal for this surgery (Whipple traction tower – Linvatec company).

- Arthroscopic portals:

- The basal joint can be explored by 1R portal (on the radial aspect of the Abductor Pollicis Longus), and 1U portal (ulnarly to the Extensor Pollicis brevis)



Figura 1. *Installation with a traction tower and stabilization of the forearm of the patient by the assistant.*

- RMC (Radio Mid-Carpal) and STT portals give a perfect visualization for STT joint exploration and arthroscopic procedures.

- Special care must be taken for the superficial nerves, the radial artery, and the tendons of the thumb. The articular spaces have to be previously located with a subcutaneous needle to avoid any false-road.
- Extrinsic ligaments:

Controversial physiology of the basal joint stabilization takes its origin in the relative complexity of the ligamentous system (11) where more than fifteen ligaments have been described. Endoscopic exploration gives the opportunity to probe directly the main structures stabilizing the trapeziometacarpal joint, especially the dorso-radial, anterior oblique and ulnar collateral ligaments (Fig. 2).

- Cartilages & bones:

Double saddle basal joint has a difficult X Ray assessment and often needs a 3Dimensional CT scan exploration. Arthroscopy gives an accurate visualization and testing of these complex articular surfaces (Fig. 3).

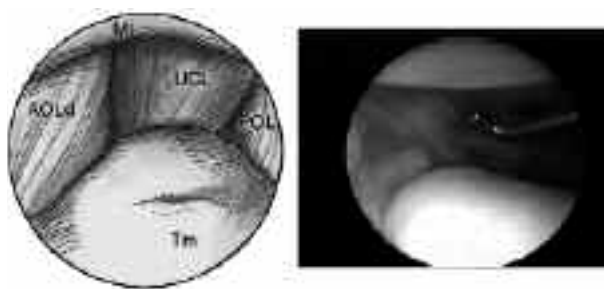


Figura 2. *Arthroscopic exploration of the ligaments of trapeziometacarpal joint.*

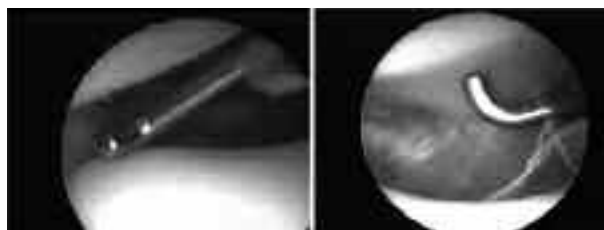


Figura 3. *Visualization and palpation of the double saddle articulation.*

INDICATIONS OF ARTHROSCOPY OF THE BASAL JOINT AND STT JOINT

Endoscopic diagnosis evaluation and therapeutic procedures have been developed for basal joint in several indications: acute traumatic lesions, post-traumatic conditions, arthritis and painful hyper laxity.

Traumatic indications

Bennett's fractures

Bennett's lesion is at the same time an articular fracture with its potential osteoarthritis evolution and an equivalent of trapeziometacarpal dislocation with the osteo-ligamentous avulsion of the ulnar stabilizing complex.

Arthroscopy control (4, 5) gives the opportunity of an accurate articular reduction and synthesis and highlight possible ligamentous and osteochondral associated lesions (Fig. 4).



Figure 4. Arthroscopic control of a Bennett's fracture (M1: first metacarpal, Tx: Trapezium, Fx: Fracture).

Basal joint dislocations and ligament tears

Trapeziometacarpal dislocation and ligaments tear are frequent lesions especially in Sport traumatology. Despite its apparent benignity regarding the usual facility of the reduction, this trauma of the basal joint needs an accurate reduction and testing of the post reductional stability. Ligament tears localization remains a difficult challenge with the clinical and radiological exam only (11). Surgical reattachment of the avulsed ligaments is fairly imperative but the surgical approach depends on its localization (volar for ulnar collateral ligament and anterior oblique ligament, dorsal for dorso-radial complex). Arthroscopic evaluation is the best way to diagnose the lesion (12) and adjust the most accurate treatment (Fig. 5). Associated lesions such as articular fractures can be evaluated and treated at the same time. For the STT joint, some lesions of the anterior stabilizing complex has been describe and can be assessed with an arthroscopic evaluation.

Post-traumatic painful basal joint assessment

Diagnosis

After a trauma of the basal joint, arthroscopy can help in the evaluation of ligaments, state of chondromalacia and possible articular step-off after a fracture (Fig. 6).



Figure 5. Arthroscopic diagnosis of basal joint ligament tear after dislocation.



Figure 6. Evaluation of an articular Bennett's fracture malunion before decision of an articular osteotomy in a professional rugby player.

Therapeutic

Debridement, shrinkage of partial ligament attenuation (13), ectomies and excision of foreign bodies.

Open surgery orientation

Ligamentoplasty, Osteotomy (Fig. 6), arthrodesis or arthroplasty.

Basal joint arthritis

Diagnosis

Evaluation of chondromalacia, Ligaments laxity association

Therapeutic

Washing and debridement of a low stage of chondromalacia can contribute in the definitive treatment of the peri-trapezium arthritis (Fig. 7). An association with hyperlaxity can profit from a peripheral shrinkage of the ligaments.

Partial trapeziectomy appears to be a safe and reliable alternative to harder procedures such as total trapeziectomy or total arthroplasty (14, 15). Interposition arthroplasty and ligamentoplasty can be performed arthroscopically with interposition of different natural or artificial devices (16).

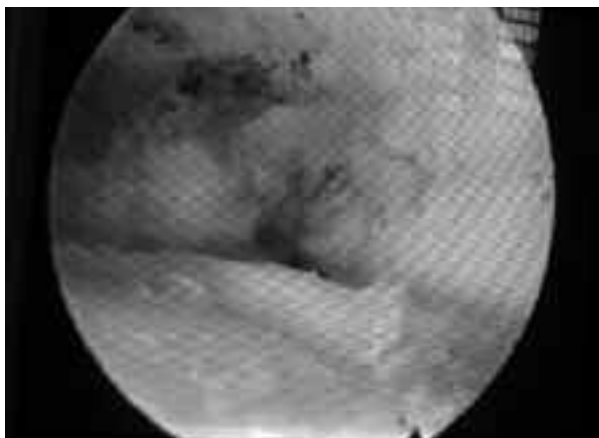


Figure 7. Chondromalacia of basal joint after debridement and peripheral shrinkage.

Painful basal joint hyperlaxity

We often observe a painful decompensation of basal joint hyperlaxity after a trauma of the first column. Ehlers-Danlos syndrome (12) can also have a painful evolution and require a specific treatment. No ligament tear is present but ligament laxity and capsular attenuation.

As in other indications (13), arthroscopic thermal capsular shrinkage can be proposed with reliable results.

A more complex ligament reconstruction can be controlled arthroscopically.

STT arthropathy

Frequent in elderly post-menopausal population

- Radiological incidence of about 50% for Swanson, North, Oberlin ...
- More frequent in anatomical studies (83% for Oberlin);
- Rarely isolated (TM arthritis, chondrocalcinosis).

Oberlin classification (Fig. 9)

- grade I: narrowing of joint space;
- grade II: joint collapse;
- grade III: adaptive DISI pattern.

Classical procedures

Surgery is proposed when conservative measures fail.

- STT arthrodesis;
- Distal scaphoid resection:
 - Palmar approach (Linscheid);
 - Dorsal approach (Saffar, Garcia-Elias) (17);
 - With (Kessler, Garcia-Elias) or no interposition (Saffar).

Complications of these classical procedures are frequent

Painful non unions (4 to 23%) for STT fusion, limited arc of motion, radioscapoid impingement,

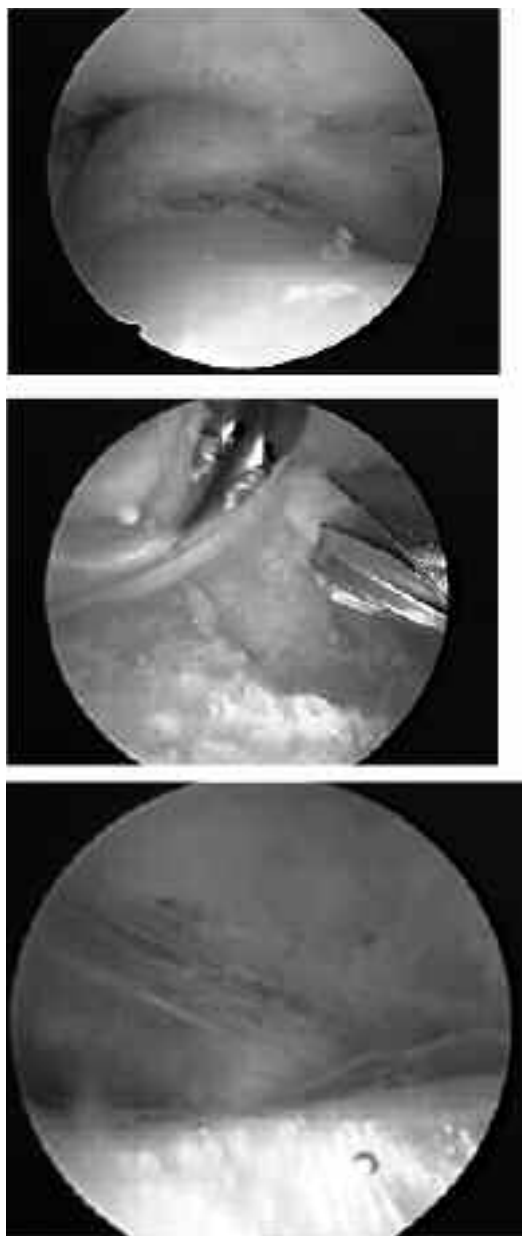


Figura 8. *Partial trapeziectomy with palmaris longus interposition arthroplasty.*

wear of silicone spacer in Silastic interposition, radial nerve irritation and STT ligaments violation in open surgery.

Technical aspects of our arthroscopic procedure

Traction tower and fluoroscan, Radiocarpal exploration



Figura 9. *STT arthropathy.*

Midcarpal exploration:

- Optical / RMC;
- Instrumental / STT;
- A palmar approach as been described but not frequently used (18, 19).

Goals of the procedure

Resection of the 2-3 distal mm of scaphoid (Fig. 10).

Conservation of ligaments on the waist of scaphoid.

The procedure can be performed with or without any interposition (tendon, absorbable device, arthroplasty (20)).

No immobilization is required. No specific complication have been reported. Constant postoperative improvement of pain and function. Quick rehabilitation. No recurrence of STT collapse at last follow-up (Fig. 10).

There is no correction of secondary DISI pattern but no degenerative changes have been observed in midcarpal space.

CONCLUSION

STT and basal joint arthroscopies are simple techniques for a wrist arthroscopist with a high level of skill. Special care must be taken for radial nerve branches.



Figura 10. *Arthroscopic resection of distal pole of scaphoid, follow-up 1y.*

Endoscopic exploration gives the best evaluation of a painful basal joint. Indications of rewarding and reliable mini invasive procedures are increasing, hence patients rehabilitate quickly with fewer complications than classical procedures.

Prospective studies are expected with longer follow-up for definitive validation of these new techniques.

REFERENCES

1. Watanabe M. Atlas of Arthroscopy. 2nd edition. Tokyo: Igakui-Shoin, 1969.
2. Watanabe M. Arthroscopy of small joints. Tokyo: Igakui-Shoin; 1985: 7.
3. Whipple TL, Marotta J, Powell J. Techniques of wrist arthroscopy. Arthroscopy 1985; 2 (4): 244.
4. Fontès D. L'arthroscopie du poignet: indications actuelles et résultats. Chir Main 2004; 23: 270-83.
5. Berger RA. A technique for arthroscopic evaluation of the first carpometacarpal joint. J Hand Surg 1997; 22A: 1077-80.
6. Orellana MA, Chow J. Arthroscopic visualization of the thumb carpometacarpal joint: introduction and evaluation of a new radial portal. Arthroscopy 2003; 19: 583-91.
7. Menon J. Arthroscopic management of trapeziometacarpal joint arthritis of the thumb. Arthroscopy 1996; 12: 581-7.
8. Walsh EF. Thumb carpometacarpal arthroscopy: a topographic, anatomic study of the thenar portal. J Hand Surg 2005; 30A: 373-9.
9. Badia A. Trapeziometacarpal arthroscopy: a classification and treatment algorithm. Hand Clin 2006; 22: 153-63.
10. Menon J. Arthroscopic evaluation of the first carpometacarpal joint. J Hand Surg 1998; 23A: 757.
11. Fontès D. The value of early ligament repair in severe sprains of the trapezoid-metacarpal joint. Acta Orthop Belg 1992; 58: 48-59.
12. Badia A. Bilateral arthroscopic tendon interposition arthroplasty of the thumb carpometacarpal joint in a patient with Ehlers-Danlos syndrome: a case report. J Hand Surg 2005; 30A: 673-6.
13. Hirsh L, Sodha S, Bozentka D, Monaghan B, Steinberg D, Beredjiklian PK. Arthroscopic Electrothermal Collagen Shrinkage for Symptomatic Laxity of the Scapholunate Interosseous Ligament. J Hand Surg 2005; 30B: 643-7.
14. Trumble TE, Rafijah G, M. Gilbert, C.H. Allan, E. North, W.V. McCallister. Thumb trapeziometacarpal joint arthritis: partial trapeziectomy with ligament reconstruction and interposition costochondral allograft. J Hand Surg 2000; 25A: 61-76.
15. Adams JE, Berger RA, Steinmann SP. Arthroscopic partial trapeziectomy and interposition arthroplasty of the thumb carpometacarpal joint. J Am Soc Surg Hand 2005; 5: 115-22.
16. A. Nilsson, E. Liljensten, C. Bergström, C. Sollerman. Results of TMC degradable joint spacer (Artelon) compared with tendon arthroplasty. J Hand Surg 2005; 30A: 280-9.
17. Garcia-Elias M, Lluch A. Partial excision of scaphoid: is it ever indicated? Hand Clin 2001; 17: 687-95.
18. Bare J, Graham AJ, Tham SK. Scaphotrapezial joint arthroscopy: a palmar portal. J Hand Surg 2003; 28A: 605-9.
19. Carro LP, Golano P, Farnas O, Cerezal L, Hidalgo C. The radial portal for scaphotrapeziotrapezoid arthroscopy. Arthroscopy 2003; 19: 547-53.
20. Pequignot JP, D'asnières de Veigy L, Allieu Y. Arthroplasty for scaphotrapeziotrapezoidal arthrosis using a pyrolytic carbon implant. Preliminary results. Chir Main 2005; 24: 148-52.