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REVIEW ARTICLE

Total ankle arthroplasty in France[☆]

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KEYWORD

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Summary

Objectives: After more than 10 years' experience in France, the French Foot Surgery Association (*Association française de chirurgie du pied* [AFCP]) presents an update on mobile-bearing ankle prostheses, based on a multicenter study.

Meta-analysis – Biomechanics – Assessment and indications: A preliminary comparative meta-analysis of the literature studies on ankle and prosthesis biomechanics, reviews validated indications and contra-indications, and details clinical and radiological outcomes assessment protocols.

Professional survey: Sixty-three surgeons (95% AFCP members) answered a professional online survey, by email or regular post: 70% performed total ankle replacement (TAR), 39% of them at least two per year and 16% more than 10 per year, resulting in 317 TARs per year or 50% of the French activity and 312 arthrodeses per year or 17% of the French activity – which gave the survey considerable power. In 2004–2005, 46% of the TARs implanted were AES®, 38% Salto® and 9% Hintegra®.

Gait analysis following TAR: This study included two series of patients (15 in Brussels and six in Paris) with laboratory gait analysis preoperatively and at 6 months' and 1 year's FU. Following TAR, speed, cadence and strides increased and mean total work approximated normal values. These two independent studies quantified the advantages of TAR over arthrodesis.

[☆] Review based on a symposium presented during the 81st meeting of the SOFCOT at the AFCP Specialty Day, 8 November 2006.

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Multicenter study: This retrospective study had a minimum follow-up of 1 year. Results were not distinguished between the four types of prosthesis (approved by the French Healthcare Agency [HAS]) involved. Inclusion criteria for operators were: AFCP membership, and experience of more than 20 prostheses of a given type. Twelve out of 15 centers responded and undertook to include continuous series. Data were centralized on a dedicated anonymous online site. Five hundred and ninety-two TARs (388 Salto®, 173 AES®, 22 Hintegra®, nine Star®) in 555 patients (mean age, 56.4 years; range 17–84 yrs) were included. Indications were post-traumatic arthritis (48%), arthritis associated with laxity (15%), inflammatory arthropathy (20%), primitive arthritis (9%), prosthetic revision (2%), and miscellaneous (5%). Sixty-one percent of operations included associated procedures: 208 Achilles lengthenings, 45 subtalar arthrodeses, nine calcaneal osteotomies and 45 lateral ligament reconstructions. Complications comprised 53 malleolar fractures, and 39 cutaneous and seven infections (9%). At a mean 37 months' FU, 87.5% of patients were satisfied or very satisfied; mean functional score was 82.1/100; radiographic mobility, 23.2°; and total SF 36 score (on the Short Form Health Survey), 66. X-ray found stable anchorage in 98% of cases, cysts in 15%, and calcification in 4%.

Revision for failure: Overall cumulated survivorship was 88% at 71 months: 22 patients underwent arthrodesis (61% satisfied), and 10 implant replacement (50% satisfied).

Conclusion: This multioperator, multi-implant series of 592 patients confirmed literature data. Prospective follow-up of the cohorts managed in these expert centers is essential, in order to make available long-term data.

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Introduction

Since their advent in 1989, third generation (mobile bearing) implants have met with a real enthusiasm in France. The pioneers of ankle implant surgery started off with the models available on the market, then refined certain elements, leading to new implants, and developed ancillary instrumentation to improve implantation quality.

After more than 10 years' experience, the French Foot Surgery Association (*Association française de chirurgie du pied* [AFCP]) undertook a study of results from a large number of French centers, to shed light on failure and to determine the limitations of this new technology so as to clarify indications and essential associated procedures.

History and meta-analysis

History

The first ankle implantation was performed by Buchholz in Hamburg in 1970, with a spherical device, resembling an inverted hip prosthesis. This first generation, however, did not live up to expectations. Despite many alterations to the design and to the number of components, second-generation results remained disappointing [1]. Not until the 1980s did third-generation models appear, comprising of three components with a mobile bearing [2]. These designs conserved bone capital, rotation axis and foot-tibial alignment, and their biological fixation provided good results, encouraging further development [3–5].

Exhaustive literature review (more than 130 references) proved disappointingly repetitive, with small series and short follow-up. Even so, a horizontal reading can retrieve and define the underlying concepts and a vertical reading spotlights certain articles of special interest.

Horizontal analysis

- **Indications and contra-indications:** The ideal patient can be defined, in terms of age, normal weight and some minor physical requirements. There should be good bone capital, normal vascular and cutaneous status, and little, if any, medical comorbidity. The ankle should be stable or at least stabilized, with hindfoot axis defect either absent or corrected [6].
- The most frequent complications are peroperative fracture, mechanical impingement, and radiologic abnormality on medium-term follow-up [7,8].
- Results were usually reported as survivorship curves [9], which need precise study, in terms of confidence intervals, and in relation to radiologic evolution [10], functional score [11] and mobility (where results should be measured on weight-bearing views).

The future lies in biomechanical studies (baropodometry, gait analysis) correlated to functional results.

Vertical analysis

- Associated procedures are essential, and the prime difficulty of this kind of surgery lies in their indications and prioritization [12].
- Analysis of results by etiology reveals higher rates of postoperative pain and stiffness associated with post-traumatic indications [10].
- Correlation of surgeon experience with results [13] surprisingly found little benefit of experience: i.e., implantation techniques are now reliable [14]. Other reports recommend solutions to limit peroperative complications [15].

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