

# A Dutch Survey on Circumpatellar Electrocautery in Total Knee Arthroplasty

Hans-Peter W. van Jonbergen<sup>\*,1</sup>, Alexander F.W. Barnaart<sup>1</sup> and Cees C.P.M. Verheyen<sup>2</sup>

<sup>1</sup>Department of Orthopedic Surgery, Deventer Hospital, P.O. Box 5001, 7400 GC Deventer, The Netherlands

<sup>2</sup>Department of Orthopedic Surgery and Traumatology, Isala Clinics, P.O. Box 10500, 8000 GM Zwolle, The Netherlands

**Abstract:** *Introduction:* Anterior knee pain following total knee arthroplasty is estimated to occur in 4-49% of patients. Some orthopedic surgeons use circumpatellar electrocautery (diathermy) to reduce the prevalence of postsurgical anterior knee pain; however, the extent of its use is unknown.

*Materials and Methodology:* In April 2009, a postal questionnaire was sent to all 98 departments of orthopedic surgery in The Netherlands. The questions focused on the frequency of total knee arthroplasties, patellar resurfacing, and the use of circumpatellar electrocautery.

*Results:* The response rate was 92%. A total of 18,876 TKAs, 2,096 unicompartmental knee arthroplasties, and 215 patellofemoral arthroplasties are performed yearly in The Netherlands by the responding orthopedic surgeons. Of the orthopedic surgeons performing TKA, 13% always use patellar resurfacing in total knee arthroplasty for osteoarthritis, 49% use selective patellar resurfacing, and 38% never use it. Fifty-six percent of orthopedic surgeons use circumpatellar electrocautery when not resurfacing the patella, and 32% use electrocautery when resurfacing the patella.

*Conclusion:* There is no consensus among Dutch orthopedic surgeons on the use of patellar resurfacing or circumpatellar electrocautery in total knee replacement performed for osteoarthritis. A prospective clinical trial is currently underway to fully evaluate the effect of circumpatellar electrocautery on the prevalence of anterior knee pain following total knee arthroplasty.

**Keywords:** Knee osteoarthritis, arthroplasty, patella, health care surveys, electrocoagulation, diathermy.

## INTRODUCTION

An estimated 4-49% of patients report anterior knee pain following total knee arthroplasty (TKA) [1-6]. The cause is unknown, but is hypothesized to be related to patient characteristics [1, 7, 8], prosthetic design [3, 9, 10], operative technique [11], and/or the use of patellar resurfacing [1, 2, 12]. Both the peripatellar soft tissues and the infrapatellar fat pad have been implicated as the source of anterior knee pain [13, 14]. Immunohistochemical studies on innervation of the anterior knee demonstrated substance-P nociceptive afferent fibers in the peripatellar soft tissues [15]. Production of a lesion in these pain receptors using electrocautery (diathermy) could theoretically achieve desensitization or denervation of the anterior knee [16-18].

Some orthopedic surgeons perform circumpatellar electrocautery to reduce the prevalence of anterior knee pain after TKA. The extent of its use in clinical practice both in The Netherlands and elsewhere is at present unknown. We aimed to determine the prevalence of circumpatellar electrocautery performed during total knee arthroplasty for osteoarthritis in The Netherlands.

## MATERIALS AND METHODOLOGY

In April 2009, a postal questionnaire with cover letter and postage free, addressed return envelope was sent to all 98 departments of orthopedic surgery in The Netherlands. The questions related to TKA for osteoarthritis (but not rheumatoid arthritis), patellar resurfacing, and the use of circumpatellar electrocautery. Furthermore, the questionnaire evaluated the number of orthopedic surgeons in each practice, the number performing knee replacement surgery, and the number and type of knee arthroplasties performed (total knee arthroplasty, unicompartmental arthroplasty, and patellofemoral arthroplasty).

If after 3 weeks no completed questionnaire was received, a reminder with a copy of the questionnaire was sent. Remaining nonresponders were contacted by telephone after 6 weeks.

## RESULTS

The response rate was 62% after the first questionnaire, 82% after repeat mailing, and 92% after telephone contact.

A total of 18,876 TKAs, 2,096 unicompartmental knee arthroplasties, and 215 patellofemoral arthroplasties are performed yearly in The Netherlands by 383 of the 477 responding orthopedic surgeons; 80% of responding surgeons perform knee arthroplasty. Among respondents, the

\*Address correspondence to this author at the Department of Orthopedic Surgery, Deventer Hospital, P.O. Box 5001, 7400 GC Deventer, The Netherlands; Tel: +31 570 535155; Fax: +31 570 501431; E-mail: vanjonbergen@dz.nl

average number of TKAs by surgeons who perform knee replacements was 50 per year (range, 18 to 101).

Of the orthopedic surgeons performing TKA, 13% always use patellar resurfacing in total knee arthroplasty for osteoarthritis, 49% use selective patellar resurfacing, and 38% never use it (Table 1).

**Table 1. The Use of Patellar Resurfacing in Total Knee Arthroplasty for Osteoarthritis Among 383 Orthopedic Surgeons in The Netherlands**

Always	13%
Selective	49%
Never	38%

Fifty-six percent of orthopedic surgeons performing knee replacements use circumpatellar electrocautery when not resurfacing the patella, and 32% use electrocautery when resurfacing the patella (Table 2).

**Table 2. The Use of Circumpatellar Electrocautery in Total Knee Arthroplasty for Osteoarthritis Among 383 Orthopedic Surgeons in The Netherlands**

Non-resurfaced patella	56%
Resurfaced patella	32%

Surgeons were questioned regarding the clinical conditions that were treated with selective resurfacing. A total of 78% of orthopedic surgeons who use selective resurfacing mentioned articular cartilage or severity of patellofemoral osteoarthritis, 34% preoperative anterior knee pain, 20% patellofemoral instability, 11% poor congruency of the native patella with the prosthetic trochlear groove, 1% the type of knee prosthesis used, and 4% reported other indications.

## DISCUSSION

The source of anterior knee pain after TKA is poorly understood; both the peripatellar soft tissues and the infrapatellar fat pad have been implicated [13, 14]. Immunohistochemical studies on innervation of the anterior knee demonstrate hyperinnervation of the peripatellar soft tissues [15]. Production of a surgical lesion in these pain receptors could theoretically achieve desensitization or denervation of the anterior knee [16-18]. The use of circumpatellar electrocautery in order to reduce the prevalence of anterior knee pain after total knee arthroplasty is reported by several authors [7, 19-23]. However, only one clinical study has addressed the efficacy of circumpatellar electrocautery in total knee arthroplasty to date [24]. Results showed improved pain relief after patellar denervation, but the inferior study design of this trial prevents confident application of this procedure to clinical practice. Prior to the current study, the extent to which surgeons use circumpatellar electrocautery in clinical practice was unknown.

The use of patellar resurfacing varies between countries. According to the 2009 Annual Report of the Swedish Knee Arthroplasty Register [25], patellar resurfacing is used in

less than 10% of TKA cases in Sweden, 70% of cases in Denmark, 5% in Norway, and 45% of cases in Australia. The reasons for these regional differences are unclear. In 1996, a survey of TKA techniques in the United Kingdom showed 32% of orthopedic surgeons always performing patellar resurfacing, 49% sometimes using resurfacing, and 19% never using it [26]. This great disparity as to whether the patella should be resurfaced was apparent in the present study as well, with surgeons reporting always, selectively, or never performing resurfacing in 13, 49 and 38 percent, respectively. Clearly, the ongoing debate on the need for patellar resurfacing has not resolved this important issue.

Strengths of the current study include the high response rate and the fact that our study is the first to determine the prevalence of circumpatellar electrocautery among orthopedic surgeons. The present survey has some limitations that should be considered. Firstly, we cannot rule out the possibility that a nonresponse bias was introduced using the survey. To reduce the chance of a nonresponse bias, we maximized the response rate by designing a mixed-mode (mail and telephone) survey following the recommendations by others [27]. No nonresponse analysis was performed to determine if characteristics of respondents and non-respondents differ. Additionally, we assumed the group of responders to be a representative sample of all Dutch orthopedic surgeons. Secondly, we did not inquire about the technique used to perform circumpatellar electrocautery. Currently, there is no adequate description of the technique in the literature. One could argue that the different procedures collectively described as patelloplasty may also result in partial denervation. These patelloplasties consist of various combinations of debriding or shaving of the patella, removal of osteophytes, peripatellar synovectomy, and reduction of size of the patella [1, 3-6, 28]. As patellar resurfacing requires removal of osteophytes and synovial tissue to enable accurate resection and restore patellar thickness, this may, at least in part, also be considered denervation. Thirdly, the survey was limited to orthopedic surgeons in The Netherlands, and the results may therefore not be representative for the practice pattern in other countries.

A prospective, randomized controlled trial comparing total knee arthroplasty with and without the use of circumpatellar electrocautery is currently underway to determine the effect of this intervention on post-TKA anterior knee pain (Dutch Trial Register, www.trialregister.nl, NTR1326).

## CONCLUSION

Of the Dutch orthopedic surgeons performing TKA, 56% use circumpatellar electrocautery when not resurfacing the patella, and 32% use diathermy when resurfacing the patella. A prospective clinical trial is currently underway to fully evaluate the effect of circumpatellar electrocautery on the prevalence of anterior knee pain following total knee arthroplasty.

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