

Guest editorial

Manipulation under anesthesia: to do or not to do, that is the question

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Joint stiffness following knee arthroplasty is a disabling complication. One treatment option is manipulation under anesthesia (MUA). However, there is no consensus on what amount of reduced motion indicates MUA, as reflected by the varying amount of stiffness and incidence of MUA reported. In a meta-analysis from 2019 the prevalence of stiffness after primary total knee arthroplasty (TKA) was 4% but varied between 0% and 18% in the 35 included studies with 48,873 TKAs. However, the studies included different definitions of stiffness/flexion contractures (1). The incidence of MUA has been reported, mostly from single centers/surgeons, to vary between 0.5% (2) and 10% (3). This variation is more or less in line with the findings in a Swedish national study on the incidence of MUA, including all 75 hospitals performing knee arthroplasties between 2009 and 2016. The incidence was 1.7%, but varied between 0% and 5% among these hospitals (4). Numerous potential risk factors have been reported for insufficient range of motion (ROM) after knee arthroplasty, among others being younger age (5), female sex (6), ethnicity (7), high BMI (1), smoking (5), comorbidities such as diabetes (7), spinal deformity (8), warfarin treatment (9), history of previous knee surgery (5), and limited preoperative ROM (5). Also, the optimal timing of MUA is unknown. Early intervention has been suggested to be favorable (5,10) while others found no difference between early and late intervention (11). However, what is called early intervention varies from ≤ 6 to 20 weeks in studies. The purpose of MUA is to gain flexion and/or extension. Several risk factors have been suggested to be associated with the outcome of MUA such as diabetes (12), prior surgery (13), preoperative ROM, type of prosthesis (12), BMI (14), smoking (14), and timing of MUA (8).

Acta Orthopaedica has recently published 2 studies evaluating MUA after primary total knee arthroplasty, both from single centers in Finland (3,15). The 2 studies have different purposes. Rantasalo et al. (3) evaluated preoperative fac-

tors associated with postoperative stiffness of the knee in 39 patients needing MUA and the outcome 1 year postoperatively while Sala et al. (15) evaluated the outcome of MUA and tried to identify factors affecting the outcome in 145 patients 2 months after MUA. Rantasalo et al. (3) used a randomized study consisting of 391 patients that aimed to evaluate the use of tourniquet and anesthesia, and identified 39 patients who underwent MUA (10%) and compared those with patients without MUA 1 year postoperatively. They found that postoperative pain was associated with stiffness, and that MUA performed 3 months after TKA is effective, with a 39° mean improvement in the ROM in the MUA group and similar PROMs compared with the no-MUA group at 1 year. Sala et al. (15) retrospectively identified MUAs after primary TKA in a university hospital during the period 2009 to 2019. They found 168 MUAs performed in 163 patients (2.7%) and were able to evaluate 150 MUAs in 145 patients to assess which pre-, peri-, and postoperative factors affected the outcome of MUA. The gain in flexion was 26° and in extension 3°. OKS or KSS did not improve after MUA. They found that early timing and higher BMI was associated with better gain in flexion. MUA is seen as an effective treatment of knee stiffness after TKA with many patients gaining improved ROM with few complications reported. However, most published studies considering knee stiffness after TKA and subsequent MUA have in common that they include few patients, are single-center studies and have short follow-up after MUA and may not have the possibility to show small differences that may exist. As an example, Sala et al. (15) included 145 patients, which is considered to be one of the largest studies evaluating the factors associated with the outcome of MUA. There are few studies evaluating the risk of revision after MUA. Werner et al. (6) used the PearlDiver Patient Records Database in the United States and found an increased risk of revision within 7 years in patients having MUA within 6 months compared

with those in no need of MUA (4.8% vs. 2%, OR 2.4, 95% CI 2.1–2.8). Brigati et al. (16) also found an increased risk of revision in 131 of almost 4,000 US Medicare patients (≥ 65 years) (3.4%) requiring MUA while Pierce et al. (17) did not find any increased risk in a matched case control study including 138 patients from 2 high-volume institutions in the United States. In the Swedish national study, the risk of revision after MUA was considerable higher than in the US studies with 10 years' cumulative revision rate of 10% (CI 8.6–12) (4).

The possibility to evaluate the risk of knee stiffness and MUA in national arthroplasty registers is limited. To include ROM in the registration of primaries and reoperations may be too comprehensive and end up with incomplete registrations. MUA is not defined as a revision (exchange, removal, or addition of one or more of the components in a resurfaced knee) and may be not considered as a re-operation as it is not open surgery. In the Swedish Arthroplasty Register (SAR), MUA has been registered as a reoperation since 2013 but is still inconsistently reported and thereby of uncertain value. However, with the uncertainty taken into account, MUA is the second most commonly reported reoperation after reoperations due to infection within 2 years in the SAR (18).

The large variation in the incidence of MUA after primary TKA indicates that there are believers and nonbelievers among knee surgeons as regards the value of MUA. In the UK, a postal questionnaire was answered by 82 knee surgeons: 38 respondents performed MUA routinely, 35 sometimes, and 9 never (19).

Further, this large variation may also indicate that factors other than known risk factors such as sex, age, health, and postoperative ROM influence the decision to perform MUA. The decision may to a larger extent be affected by the patient's expectations and motivation as well as the surgeon's expectations and willingness to perform MUA and not least the available resources in the hospitals concerned.

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