Musculoskeletal disorders are major causes of morbidity throughout the world with substantial influence on health and quality of life. One of the most common conditions among them is osteoarthritis (OA), from which frequently causes pain, loss of function and disability in adults.

OA is a disease related to degenerative process. Pathologically, OA is defined as a disease process of diarthrodial or movable, synovial joints characterized by focal areas of loss of hyaline articular cartilage, associated with increased activity in marginal and subchondral bone. These features, when severe, result in the characteristic radiographic changes manifested as reduced bone-to-bone distance or joint space narrowing, osteophyte formation, and subchondral sclerosis and cysts. A proportion of people with these changes develop symptoms, including use-related pain and/or effusion in the affected joints, with stiffness after inactivity. Finally, joint deformation develops resulting with impairment of joint functions.

In general, the prevalence of OA in all joints correlates strikingly with aging. Radiographic evidence of OA occurs in the majority of people about 65 years old and in about 80% of those aged over 75 years. As projected life expectancy at the world level rises, with increasing longevity and continued low fertility, it is expected to be a continued rise in the proportion of the population aged 80 years or over and in that surpassing the 100 years of age. There is then a high tendency that the impact of OA will also be increasing.

In Thailand, OA is ranked the sixth and the sixteenth, respectively, as a cause of Disability Adjusted Life Year (DALYs) for females and males in 1999. The knee is one of the most commonly affected joint among large joints. Although primary OA is rare in the hip, it is quite common in the knee. Secondary OA of this joint can be caused by various conditions, such as injuries, rheumatoid and gout arthritis.

General treatment guideline

The objectives of management for OA are to relieve pain, maintain or improve mobility, and minimize disability. Treatments in most osteoarthritic knees should start from conservative methods, which might be a combination of pharmacological and non-pharmacological modalities.

Paracetamol is the oral analgesics of first choice. However, in patients with synovitis who are unresponsive to paracetamol, oral and topical non-steroidal anti-inflammatory drugs (NSAIDs) should then be considered. Intra-articular injection of long-acting steroid is indicated for acute exacerbation of knee pain, especially if accompanied by effusion. Meanwhile, weight management, modification of daily activities, exercises to strengthen the quadriceps and/or preserving normal mobility of the knee and the use of walking aids and orthosis are strongly recommended. Currently, many novel medications have been in popular use. These include oral intake of glucosamine sulphate, chondroitin sulphate and diacerein; and intra-articular injection of chondroprotective agents, e.g., hyaluronic acid.

Because of the progressive nature of the disease, many patients with knee OA eventually require operative treatment. A variety of surgical procedures have been described, ranging from arthroscopic lavage or debridement to corrective osteotomy or total knee arthroplasty. The choice of the procedure depends on staging of the disease and the patient’s personal conditions. Joint replacement has to be considered in case of refractory pain associated with disability and radiological deterioration of the knee joint.

However, many patients incline to defer such radical surgery and prefer to try some other less invasive interventions. The intermediate choices can be joint lavage or debridement aimed to clean up inflammatory mediators and debris in the joint, subchondral bone abrasion or drilling or microfracture to introduce systemic mesenchymal cells into the worn-out area. To correct the deformity (mainly varus, valgus or flexion contracture), high tibial osteotomy is useful to restore biomechanics of the articular load distribution.

Arthroscopic treatments for OA

Arthroscopy is an operative procedure using endoscopic devices for both diagnosis and treatment of joint conditions through small portals made around the joint. Improvement of arthroscopic techniques in the 1970s gave rise to procedures associated with less morbidity. As for knee OA, this technique produces less postoperative pain and shorter rehabilitation time than the older open procedure. Arthroscopic lavage (AL) and arthroscopic debridement (AD) are popular techniques recommended for earlier and more severe stages prior to replacement arthroplasty.

AL involves visually guided introduction of saline solution into the knee joint and washing-out of excess fluid and loosened materials from the knee joint. In comparison, AD may, in addition to tidal irrigation, include chondroplasty (smoothening of unstable chondral flaps using mechanical, laser or thermal modalities) with or without further interventions such as doing microfracture, abrasion or drilling of the bone surface and; removing of redundant synovia, degenerated menisci and ligaments, osteophytes and loose bodies.

Both AL and AD are generally indicated in patients with knee pain that are refractory to medical therapy. In most patients, short-term symptomatic relief can be expected with these arthroscopic procedures. Greater and more persistent pain relief can be attained in patients who develop acute pain from mechanical disturbances, have normal lower extremity alignment and minimal radiographic evidence of degenerative changes.

Arthroscopic chondroplasty usually provides unpredictable results for articular cartilage regeneration. Concerns include the durability of the fibrocartilage repair tissues in...
subchondral penetration procedures and thermal damage to subchondral bone and adjacent normal articular cartilage in laser/thermal chondroplasty.  

**Arthroscopic debridement for knee osteoarthritis**

Early debridement techniques were based on open (non-arthroscopic) procedures. The methods were limited due to unacceptable levels of morbidity and prolonged recovery time. Literatures reporting results of AD started after noticeable improvement of the arthroscopic technique at around 1980. Many retrospective and some prospective case series have demonstrated benefits of AD on osteoarthritic knees at different stages of disease severity. Most studies report success rates of about 40-75% with favourable outcomes in reducing pain and improving functions of the knee. These effects are mainly maintained for 2-5 years or even as long as 7-13 years. 

Most authors propose that AD is a temporising treatment for knee OA, more satisfactorily if roentgenographic malalignment has not developed. Moreover, patients with mechanical symptoms and symptoms of short duration tend to do better with this intervention.

A prospective randomised study was reported in 1996 by Hubbard comparing AD with washout in 76 patients with clearly defined grades 3 or 4 degeneration of the articular cartilage of the medial femoral condyle. A total of 76 knees were suitable for the trial over a five-year period. Forty were in the AD group and 36 in the washout group. All knees were followed up for at least 1 year and 58 for 5 years. The mean follow-up time was 4.5 years in the AD group and 4.3 years in the washout group.

In year one, 32 of the AD group and 5 of the washout group were pain-free and at 5 years 19 of a total of 32 survivors in the AD group and 3 of the 26 in the washout group were also free from pain. The mean improvement in a modified Lysholm score was 28 for the AD group in year one and 21 in year five. In the washout group it was only 5 in one year and 4 in year five.

In this trial, AD appears to be the treatment of choice with over half the patients free from pain after 5 years.

However, after performing a pilot study, Moseley et al. have recently reported a randomised controlled trial (RCT) suggesting that AD may not be as effective and does not produce clinically meaningful difference from a sham surgery. Essentially, this is the only well-designed clinical study attempting to identify the intrinsic effect of the AD over a placebo effect.

This double-blind, RCT was conducted using volunteers from Houston Veterans Affairs Medical Center between October 1995 and September 1998. The trial was carried out with two comparisons, (i) AD versus placebo surgery and (ii) AL versus placebo surgery.

Eligible patients were the ones being 75 years old or younger, who had OA of the knee as defined by the American College of Rheumatology, and reported at least moderate knee pain on average (≥4 on a visual-analogue scale ranging from 0 to 10) despite maximal medical treatment for at least 6 months, and had not undergone arthroscopy of the knee during the previous 2 years.

Of the 324 consecutive patients who met the criteria for inclusion, only 180 (56%) patients agreed to participate to the trial and were randomly assigned to receive AD, AL or placebo surgery. Patients in the placebo group received skin incisions and underwent a simulated debridement without insertion of the arthroscope. Outcomes were assessed at multiple points over a 24-month period for pain and functions. A total of 165 patients completed the trial. At no point did either AD or AL report less pain or better function than the placebo group. Furthermore, the 95 percent confidence intervals for the differences between the placebo group and the intervention groups exclude any clinically meaningful difference. In other words, the benefit of AD or AL is merely a placebo effect.

This report has produced great influence on insurance policy in the western countries and instigated strong debates from many orthopaedic centres. Those who have long-term practice with good results in this area feel that the study cannot be simply generalized. They argued against the indication of the surgeries which had been inappropriately performed in too advanced cases in the trial. As the authors did not describe in details about the arthroscopic findings, it was likely that the degenerative process had already been too advanced beyond the effect of AD or AL. The interventions, therefore, could not make different positive effects from that of sham surgery. By the way, it is essential to realize that arthroscopic surgery can only remove mechanical or chemical causes of pain, but by no means help regenerate good quality cartilage out of the bare subchondral bone.

Besides, the selection bias shown by the 44% of the eligible patients who had refused to participate in the trial designated that the non-participants were those who believed in benefits of AD and did not want to take the 1 in 3 risk of undergoing sham surgery.

All in all, even though the intrinsic benefits are from the placebo effect, the 2-year benefits after both placebo and arthroscopy are relatively useful in delaying the need of radical surgery like replacement arthroplasty, especially in patients with younger age.

Aaron et al. performed a cross-sectional study of a consecutive cohort of 122 patients who underwent AD for the treatment of knee OA that had been unresponsive to anti-inflammatory therapy. They concluded that the severity of the arthritis assessed preoperatively with radiography and intraoperatively by rating the severity of cartilage lesions, influences the clinical outcome. Knees with severe arthritis fare poorly, whereas those with mild arthritis fare well, but outcome for knees with moderate arthritis is unpredictable.

**CONCLUSION**

Despite the publication of Moseley’s RCT which has provided evidence that AD and AL did not give better results than a sham surgery in reducing pain and improving functions in osteoarthritic knees, there has been overwhelming evidence supporting therapeutic values of these arthroscopic interventions. However, there is a need to further perform better-designed clinical trials to establish the effect size of the arthroscopic interventions or even of the sham surgery over non-operative treatments. Pain reduction should be well balanced with the use of other pain killers. The most important factor in determining success is proper patient selection. Patients who have end-stage OA or severe malalignment and those who do not have mechanical symptoms are unlikely to improve. The important considerations are how effective the treatment is and whether the expected benefits justify the risks, potential complications, and the cost of the interventions. Properly selected patients will benefit greatly from AD and many will be saved from the increased morbidity and potential complications of alternative treatments.
REFERENCES


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