the relative efficacy of such treatment with the OA localization (e.g. hip versus knee) is still debated.

**Objective:** Compare the magnitude of the effect on pain and function at 3, 6, and 12 months after TAR with regard to the OA localization (hip versus knee).

**Methods:** Bibliographic search: A systematic review was undertaken with the keywords “total hip replacement” (THR), “total hip arthroplasty”, “total knee replacement” (TKR), “total knee arthroplasty”, “pain”, “disability”, “functional capacity”, “function” or “osteoarthritis”, in PUBMED, the Cochrane Library and EMBASE, in January 2008, in humans, published after 1987 in English, French or Spanish.

Data collection: Pain and function before and after THR or TKR, assessed by visual analogue scale (VAS), WOMAC sub-scales or Lequesne’s index. Cohen’s effect size was calculated. Random meta-analysis was performed with pooled effect size, using the Mantel-Haenszel method with a continuity correction.

**Results:** The literature search identified 277 citations for hip and 328 for knee. A total of 27 clinical trials met the inclusion criteria (11 for hip, 12 for knee and 4 for both). The studies were published from 1995 through 2007. Total number of patients was 6244 (2520 for hip and 3724 for knee), median age 68.4 (range 59.0–71.8) for hip and 68.4 (range 62.0–82.9) for knee. 53.9% were female for hip and 62.2% for knee. The follow-up period varied between studies (1 week to 3 years), as did the time point at which outcomes were assessed.

<table>
<thead>
<tr>
<th>Effect size</th>
<th>95%CI</th>
<th>No. of patients</th>
<th>No. of studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Total</td>
<td>1.91–2.30</td>
<td>16</td>
<td>3724</td>
</tr>
<tr>
<td>3 months</td>
<td>1.61–2.80</td>
<td>8</td>
<td>1532</td>
</tr>
<tr>
<td>6 months</td>
<td>1.96–2.66</td>
<td>12</td>
<td>2025</td>
</tr>
<tr>
<td>12 months</td>
<td>1.78–2.28</td>
<td>7</td>
<td>2166</td>
</tr>
<tr>
<td>Function Total</td>
<td>1.96–2.24</td>
<td>15</td>
<td>3618</td>
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<tr>
<td>3 months</td>
<td>1.45–2.33</td>
<td>7</td>
<td>1300</td>
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<tr>
<td>6 months</td>
<td>1.90–2.30</td>
<td>11</td>
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<tr>
<td>12 months</td>
<td>2.02–2.40</td>
<td>6</td>
<td>2050</td>
</tr>
</tbody>
</table>

**Conclusions:** This meta-analysis confirms the high clinical interest of both THR and TKR in the treatment of advanced hip or knee OA and suggests that such symptomatic affect is achieved more rapidly and is of greater magnitude in hip versus knee OA.

**290 THE EFFECTS OF PROPRIOPROCEPTIVE OR STRENGTH TRAINING ON THE NEUROMUSCULAR FUNCTION IN PATIENTS WITH OSTEOARTHRITIC KNEE: A RANDOMIZED CLINICAL TRIAL

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**Purpose:** Several studies have shown that patients with osteoarthritis (OA) have an improved proprioceptive function compared to subjects with knee problems. The measurement of functional scores and proprioception potentially provides clinicians with more information on the status of the OA knees. The purpose of this study was to determine the proprioceptive skills after proprioceptive training program (PTP) versus a strength training program (STP) on neuromuscular function in patients with knee osteoarthritis (OA).

**Methods:** Forty patients with knee OA (age range: 40–62 years-old) were randomly assigned to one of the following 4-week training programs: Group 1: Neuromuscular STP with neuromuscular electrical stimulation (n=20), and group 2: PTP (n=20). The outcome measures were: (1) peak torque time of the isokinetic quadriceps muscles (ISOMED 2000), (2) timed up and go test for function, (3) visual analogue scale for pain intensity, (4) subjective score—Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for functional performance measurement. To evaluate proprioception in patients with OA, we used the angle reproduction in the lying position on Functional Squat System (Monitored Rehab Systems).

**Results:** Patients in both groups demonstrated similar significant gains in functional ability, pain intensity, subjective score isokinetic quadriceps strength and proprioception scores (p<0.05). There was a significant difference in the active reproduction test between both groups in the active lying position (p<0.05). The PT group demonstrated greater percent change in isokinetic torques than STP at the end of the 4 weeks (p<0.05).

**Quadriceps strength is a determinant of functional ability for the affected knees.**

**Conclusions:** Both training programs influenced pain intensity and isokinetic strength of the quadriceps. PTP alone can induce isokinetic strength gains also. Overall, the functional and proprioceptive outcomes demonstrate results to recommend the procedure. Restoring and increasing quadriceps strength of the affected knees is essential to maximize the functional ability of the osteoarthritic knee. A longitudinal study with a larger sample size is needed to confirm the potential use of proprioceptive training for patients with knee OA.

**291 CAN VIBRATION ANALYSIS BE USED TO EVALUATE KNEE OSTEOARTHRITIS?

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**Purpose:** The purpose of this research was to investigate the possibility of using vibration analysis to detect and assess the extent of osteoarthritis (OA) in the knee. We also examined the correlation between vibration analysis and MRI detected features.

**Methods:** 80 patients from healthy to severe, were recruited from local rheumatology clinics. For each patient MRI and vibration recordings were made on both knees. MRI images were analyzed by a radiologist and different symptoms related to osteoarthritis in the knee were scored for each subject’s knee using a validated MRI scoring standard (“KABON”). Vibration signals of the patients’ knees were recorded using 5 accelerometers placed at different locations on the knee during a squatting motion. In order to be able to simultaneously record vibration signals from various knee locations with minimum interference, we designed and developed a brace which would allow the required motion with minimum mechanical and noise interference with data acquisition (Fig. 1).

**Figure 1. Brace used for collecting vibration data from subjects’ knees**

**Analysis:** We used principal component analysis (PCA) and partial least squares (PLS), multivariable, latent space analysis/regression techniques to statistically process the data, yielding classification plots. These techniques have superior performance compared to ordinary multivariable regression and classification techniques when dealing with large numbers of correlated variables.

We used PCA and PLS to assess the correlation between the vibration signals generated by the motion in the knee and the rheumatologist’s diagnosis as well as the MRI features recorded earlier.

**Results:** Figure 2 shows a scatter plot of the PCA classifier. In this type of classification a hyper plane (line in two dimensional space) separates two classes of observations; one is the group of patients with physician diagnosed knee osteoarthritis and the other is the control group which does not. For this system of classification the sensitivity was 86% and the specificity was 74%. The positive and negative predictive values were 77% and 84% respectively. The accuracy was 84%.

**Correlation with MRI features:** We found a strong correlation between vibration results and some of the features identified by MRI scanning such as osteophyte formation and cartilage degeneration of the knee. Our results show that our recorded vibration signals are the result of osteophyte formation, cartilage degeneration and meniscus damage/degeneration. We did not find any strong correlation between the vibration signals and other osteoarthritis symptoms such changes of bone features like bone marrow edema and subcondral cyst.

**Conclusions:** The development of knee OA is accompanied by changes in the quality and loss of cartilage, formation of osteophyte and a lowering
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of synovial fluid viscosity in the knee. These features in turn contribute to increased friction between the articulating surfaces of the knee and hence generate vibration during motion. This vibration is detectable using non invasive techniques described above and can be analyzed to assess the quality of the knee joint and to detect and discriminate development of osteoarthritis in patients.

Figure 2. Principal Component Analysis Scatter Plot used for classifying normal and suspected OA patients.

292 EROSIIVE VERSUS NON EROSIIVE HAND OA: PROSPECTIVE CROSS-SECTIONAL COMPARISON OF CLINICAL DATA

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Purpose: Erosive Hand OA (HOA) has been described. Whether it is a specific entity or a step during the pathologic process remains controversial. However, few works have studied the clinical presentation of patients. Our objective was to compare clinical features in erosive versus non erosive HOA patients.

Methods: This was a prospective cross-sectional study. Successive outpatients visiting at the Hand OA consultation centre of St-Antoine hospital have been examined according to a standardized case report form. Postero-anterior radiographs of both hands on a single film were taken. Erosive HOA was defined by the presence of at least 2 joints exhibiting erosive radiographic features as described by Verbruggen [1].

Data collected: demographics; personal and familial medical history; HOA history; clinical and radiological description, including nodes, pain VAS, pain on joint pressure, function assessed by the Functional Index for Hand Arthropathies (FIHOA), aesthetic damage (100 mm VAS), quality of life of the SF12, psychological impact of the disease by the Hamilton Anxiety Depression scale (HAD), number of radiologically affected joints and number of joints with erosions.

Statistics: mean [standard deviation (sd)]; Fisher or Kruskal tests for comparisons.

Results: 101 patients were described, radiographic data recorded for 88 patients. 90% women, 10% men, mean age 63.8 (8.7), BMI 23.4 (3.4), 4 with a personal, 5 a familial history of psoriasis, 63% with a familial history of HOA, mean symptoms duration 10 (7.5) years. 8 had diabetes and 20 hypothyroidy. 38 patients were classified as erosive and 50 as non erosive. Demographic data were similar in both groups. ESR and CRP levels were similar in both groups (14.7 mm vs 13.6 and 3.7 vs 4.3 respectively). Comparisons of clinical data between both erosive and non erosive HOA appear in the table:

| Clinical data | Erosive HOA (n=38) | Non erosive HOA (n=50) | P
|---------------|--------------------|------------------------|---
| Night awakening (% yes) | 32% | 32% | 1.00
| Morning stiffness (Yes) | 54% | 54% | 1.00
| Duration (m) | 17.5 | 17.5 | 0.65
| Pain at rest (VAS, mm) | 19.0 (17.2) | 23.1 (22.6) | 0.68
| Pain on move (VAS, mm) | 52.7 (22.7) | 45.5 (25.6) | 0.18
| Aesthetic damage (VAS, mm) | 57.5 (38.1) | 32.9 (34.5) | 0.005
| Global disease assessment (VAS, mm) | 48.6 (25.4) | 38 (28.8) | 0.15
| FIHOA (0–30) | 10.0 (6.7) | 6.7 (9.7) | 0.005
| SF 12 MCS (0–100) | 47.7 (9.7) | 47.6 (9.2) | 0.97
| SF 12 PCS (0–100) | 40.4 (7.5) | 43.6 (8.8) | 0.12
| SF 12 total (0–100) | 44.0 (6.5) | 45.6 (7.4) | 0.40
| HAD total (0–21) | 6.9 (2.9) | 6.2 (3.3) | 0.26

Conclusions: This study shows that almost 43% of patients visiting for HOA can be classified as erosive HOA. Inflammation or pain at rest were not higher in erosive HOA. Erosive HOA patients reported more aesthetic damage and functional impairment.

References


293 CLINICAL AND RADIOLOGICAL FINDINGS IN HAND OSTEOARTHRITIS

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Purpose: To investigate clinical and radiographic features of hand osteoarthritis (HOA) and to compare them in the erosive and non-erosive subsets of disease.

Methods: We enrolled 360 outpatients with symptomatic HOA; 199 with erosive HOA (EHOA) and 161 with non-EHOA. 307 age- and sex-matched subjects without clinical signs of HOA were enrolled as normal controls (NC). Anteroposterior radiographs of both hands were obtained from all HOA patients. Demographic (age, sex, disease onset, sex), clinical (enlarged and/or tender joint assessment of trapeziometacarpal, proximal – PIP – and distal – DIP – interphalangeal joints; symptomatic knee or hip osteoarthritis; body max index – BMI; familial history of HOA; comorbidities) and radiological (Kallman’s score) data were recorded and analyzed. Student’s T and Chi squared test were used to compare quantitative and qualitative variables, respectively.

Results: In HOA patients hip and knee involvement was more frequent than in NC (hip OA: 9.5% vs 2.3%, p = 0.001; knee OA: 19.9% vs 11.4%, p = 0.008). Ischemic heart disease (4.5% vs 1.6%, p = 0.044), thyroiditis (6.2% vs 1.6%, p = 0.003), and hypercholesterolaemia (23.3% vs 13.7%, p = 0.002) were more frequently observed in HOA patients. Significant differences between EHOA and non-EHOA are reported in the table. BMI values, prevalence of symptomatic hip or knee OA, tobacco smoking, HOA family history, and comorbidities were similar in the two subsets.

Conclusions: HOA is frequently associated with OA in other joints and it shows higher prevalence of hypercholesterolaemia and ischemic heart disease and which deserves further confirmation from a larger series of patients. Since the significant differences between EHOA and non-EHOA are mainly related to disease severity (number of joints involved, Kallman’s grading) we suggest EHOA is a more severe stage of disease and not a distinct nosographic entity.

Table 1:

| Differences between EHOA and non-EHOA patients | EHOA | non-EHOA | p
| Age (yrs), mean±sd | 68.2±7.9 | 66.5±8.8 | 0.05
| Age at onset (yrs), mean±sd | 53.5±9.5 | 56.3±9.9 | 0.01
| Joint involvement (n), mean±sd | 10.4±4.4 | 8.1±4.3 | <0.0001
| Kallman’s score, mean±sd | 96.3±22.7 | 68.9±18.6 | <0.0001

294 AESTHETIC ASSESSMENT IN HAND OA AND ITS POSSIBLE DETERMINANTS

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Purpose: Aesthetic damage is one of the major complaints of hand OA (HOA) patients in consultation, especially, women, but no clinical work has been performed assessing this major issue. No tool up to now has been developed to evaluate this outcome.

Objective: To evaluate self-perceived aesthetic damage in HOA patients and its possible determinants.

Methods: This was a prospective cross-sectional study. Successive outpatients visiting at the Hand OA consultation centre of St-Antoine hospital have been examined according to a standardized case report form. Postero-anterior radiographs of both hands on a single film were performed. Data collected: Patients were asked to score their perceived aesthetic damage on a 100-mm visual analog scale (VAS). Other data recorded were demographics, personal and familial medical history, HOA history, clinical and radiological description, including nodes, pain (VAS), pain on joint pressure, function assessed by the Functional Index for Hand