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Functional treatment of the patellofemoral pain syndrome in adolescent girls—is the McConnell program efficacious?—a pilot study

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A study was made of the efficacy of conservative treatment of the patellofemoral pain syndrome 'using the 'McConnell program'. The main parts of this program are taping to correct abnormal tracking of the patella and specific training of the m. vastus medialis obliquus (vmo). Two causal chains were postulated to explain the effect of the program. The first chain is deduced from the assumption that in patients with patellofemoral pain, the tracking of the patella is abnormal as the result of insufficiency of the vmo. Elimination of the abnormality of the patellar tracking would lead to alleviation of pain resulting in improved physical and social functioning. Regarding the second causal chain, it is assumed, as an alternative, that impaired co-ordination of the entire quadriceps causes irregular transfer of pressure from the patella to the femur. Improvement of the quadriceps co-ordination would lead to increased weight-bearing capacity of the patellofemoral joint. This would diminish the pain. The patient's experience that the pain diminishes due to his/her own efforts (vmo training and taping) gives him/her a sensation of ability to control the pain. This, in combination with the physical recuperation, might lead to improved physical and social functioning.

The two chains were tested with the aid of a randomized clinical trial. The study population consisted of 23 adolescent girls with patellofemoral pain. They were assigned, partially at random, to two groups. Group 1 (n=18) underwent the McConnell program, group 2 (n=5) received a placebo treatment. Radiographs showed no abnormal position of the patella, and the position did not change after taping.

Taping caused a significant abatement of the pain in the experimental group. Electromyographic examination of the quadriceps revealed no significant differences in the activities of the m. vmo, m. vastus medialis (vm) and the m. vastus lateralis (vl) measured before, during and after the treatment. Timing of the vmo, vm and vl during, before and after treat-

ment revealed no significant differences, either. The experimental group at measurement after treatment showed a significant increase of the weight-bearing capacity of the patellofemoral joint and of physical and social functioning, and a significant alleviation of the pain. The patients felt that they had better control over the pain after than before treatment. The control group on most variables scored less well than the experimental group.

It may be concluded that the McConnell program is efficacious in adolescent girls with patellofemoral pain. McConnell's causal chain appears not to explain the effects of the program correctly. The alternative causal chain, on the other hand, does appear to offer a plausible explanation of the effect of the McConnell program.

Reference: McConnell. The management of chondromalacia patella. A long-term solution. Aust J Physiother 1986; 32: 215-223.

The role of continuous passive motion in the aftertreatment of total knee arthroplasty

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Continuous passive motion (CPM) is used as an additional remedy after many operations on the locomotor system. One of these applications is the after-treatment by cpm after total knee arthroplasty (TKA).

This prospective study was concerned with the following factors of cpm after tka: duration of hospitalization, range of motion (ROM), knee function score and complications.

Material: From July 1993 through October 1995, 83 patients, in whom TKA had been performed 90 times, were followed up.

These knees were assigned at random to 3 protocols. Thirty knees, with an average age of 73 years, were treated according to protocol 1. In these patients, no CPM was applied, but the standard after-treatment with physical therapy was administered.

Another 30 knees, with an average age of 70 years, were treated according to protocol 2, with physical therapy com-

bined with CPM, 4 hours daily. CPM was applied from the 2nd through 5th day postoperatively.

Thirty knees, with an average age of 70 years, were treated according to protocol 3. These patients, in addition to the standard physical therapy, were subjected to CPM for 20 out of every 24 hours. In these cases, also, treatment was administered from the 2nd through 5th day postoperatively.

Duration of hospitalization, ROM, knee function score and complications were studied during a follow-up period of one year, with examinations before and 3, 6 and 12 months after the operation. All these examinations were carried out by the same person, who was not informed of the protocol used.

Results: Mean hospital stay was 17.4 days in group 1, 18.0 days in group 2 and 17.3 days in group 3. There were no significant differences in ROM between the groups. In group 1, the ROM decreased from 110.0 to 105.3 after one year. Group 2 showed a decrease from 108.7 to 106.2 and group 3, a decrease from 104.1 to 102.6.

There were no differences in knee function score between the groups, either. Group 1 scored 69.3, group 2 scored 68.8 and group 3 scored 69.8.

In the groups in which CPM was applied there were 5 cases of hematoma or superficial wound infection, and 5 cases with manipulation under anesthesia.

In group 1, there were no wound hematomas or knees which required manipulation under anesthesia. On the other hand, there were 2 cases of superficial wound infection in this group.

Conclusion: This prospective study revealed no significant differences between the protocols applied as regards duration of hospitalization, ROM or knee function score.

In the group not subjected to CPM, we saw fewer complications in the form of hematomas or continued motion requiring anesthesia. CPM is not an indispensable aid in the after-treatment of TKA.

More rapid healing of fractures of the 5th metacarpal bone due to functional taping

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Fractures of the 5th metacarpal bone can be treated conservatively with plaster cast or tape. These two methods were compared in a prospective randomized trial.

Material: We treated 25 patients with a standardized ulnar gutter cast and taped 25 others. Functional recovery was evaluated after 1 and 4 weeks and after 3 and 6 months.

Mobility, grip force, traction force and functional torsion forces were measured. The radiological change in fracture position was measured after 4 weeks. Residual symptoms were evaluated after 6 months.

Results: Functional recovery was significantly more rapid in the tape group. After 6 months, there was no longer any significant difference in functional or anatomical results, nor

in the numbers of patients with residual symptoms. In both groups, changes in the fracture position were seen only in patients subjected to repositioning.

Conclusion: Fractures of the 5th metacarpal bone should be treated with tape rather than with a plaster cast.

Ultrasonography in suspected dysplasia of the hip

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Material and methods: We studied the importance of various risk factors in a group of 583 children referred with suspected dysplasia of the hip. Most referrals had been instigated by a physician of a child health center. History-taking and physical examination were repeated in all children. No abnormalities were observed any longer in 99 children (13%), which fact is attributed to interobserver variation.

Ultrasonographic examination of the hips was included in the first consultation. The suspicion of dysplasia of the hip was rejected or confirmed on the basis of this examination. Additional roentgen examination was carried out in 223 children.

Results: No differences were found in these cases between the results of the ultrasonographic and of the radiological examination. Ultrasonography revealed an abnormality of the hip in only 122 children (21%). Not a single anamnestic indication or physical symptom could be identified that might be used to confirm or negate the suspicion of dysplasia.

Conclusion: It is concluded on the basis of these results that screening for hip dysplasia leads to referral of a large group of children of whom only a minor proportion actually have some abnormality of the hip.

In addition it is concluded that repetition of the history-taking and of the physical examination of children referred in connection with a possible hip dysplasia is of little use; ultrasonography of the hips is to be preferred.

Ultrasonography is recommended as the method of choice to screen for dysplasia of the hip.

Hohmann osteotomies in hallux valgus—the influence of metatarsus primus varus during a 5-year follow-up

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The magnitude of the intermetatarsal angle is important in the preoperative planning in patients with hallux valgus.

Patients and methods: We examined 21 patients (24 toes) who had been treated for hallux valgus with a displacement

osteotomy of M I according to the method of Hohmann. We compared the long-term results of patients with normal intermetatarsal angles (IMT angles) with those of patients with metatarsus primus varus (MPV). The toes were evaluated on the basis of subjective, clinical and radiological criteria.

Results: In 9 patients with a normal IMT angle, the hallux valgus angle was corrected from 25 to 15 degrees.

In 13 patients with MPV, the hallux valgus angle was corrected from 35 to 17 degrees. The subjective and radiological results of patients with MPV were worse than those in the group of patients with normal IMT angles. In both groups, one patient was reoperated.

Conclusion: The Hohmann osteotomy is a good method of treatment for patients with a normal IMT angle. Metatarsus primus varus appears to be an unfavorable prognostic factor for the treatment of hallux valgus by means of subcapital osteotomies.

The effect of a CTI-2 brace on walking efficiency, muscular force and muscular fatigue in patients with an unstable knee and in control subjects

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In view of the increasing use of the brace to improve the knee stability in ACL rupture, both pre- and postoperatively, it is important that adverse effects, if any, should be excluded. The discussion whether wearing a knee brace does or does not result in muscular atrophy and reduction of muscular power of the m. quadriceps (Q) and the hamstring muscles (H) is topical. Further investigation of the effect of wearing a knee brace (weight and/or mechanical impairment) on the walking efficiency should also be investigated further.

Patients and methods: The study material comprised 11 patients (P) with an unstable knee due to ACL rupture and limited other knee pathology, and 13 control subjects (C) without knee pathology. All the enrolled subjects wore a made-to-measure CTI-2 brace (Innovation Sports, Irvine, California USA) continuously for 4 weeks (except at night). P and C were tested twice, (once without and once with the brace) at the start and again after 4 weeks. The testing comprised (i) walking test at three different speeds with measurement of energy consumption, (ii) maximal power) and (iii) staying power of the Q and H, (iii) leg circumference.

Results: Wearing the brace had no effect on the energy consumption in either P or C. A supplementary test with a weight of 600 g (weight of the CTI-2 brace) around the knee revealed no changes in energy consumption, either.

The brace leg showed no alterations in leg circumference, maximal power or anaerobic staying power of Q or H in either P or C. The aerobic capacity of the Hs appeared to display a tendency to decrease in both groups.

The non-brace leg of C increased in circumference and in

maximal power of the H. In P, only the leg circumference showed a slight increase.

Discussion and conclusion: Wearing the CTI-2 brace does not cause an increase of energy consumption, in contradistinction to a number of other investigations during which an increase of oxygen uptake was observed during use of the brace. These differences are probably to be attributed to difference in weight of the braces and/or mechanical differences.

Since wearing the CTI-2 brace does not lead to a decrease of maximal power of Q and H, it is concluded that the stabilizing effects of the brace are not offset by adverse effects on the muscular system round the knee.

Gastrocnemius flap in wound healing problems after total knee arthroplasties

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Patients with wound healing problems after total knee arthroplasty, such as dehiscence and necrosis, run an increased risk of infection of the implant. One method, often forgotten and described in the literature only in small series, is covering these skin defects with (fascio)cutaneous flaps and free or pedicle vascularized muscle flaps, of which the pedicle gastrocnemius muscle flap is the most successful example.

Method: A retrospective study was made of six patients who had had a skin defect after a total knee prosthesis and who had been treated with gastrocnemius flap transposition combined with a split skin graft. Attention was paid to the interval between the start of the wound problem and the gastrocnemius operation, to the cultured agent, to the taking and covering of the gastrocnemius flap, to the preservation of the prosthesis and to the knee function as determined with the Knee Society Clinical Rating System.

Results: Four of the six patients had developed a wound healing problem within one week after the total knee prosthesis, one patient after 3 months and one patient after 16 months. One or more bacterial species were cultured in five patients.

Treatment with a gastrocnemius flap was carried out 11 weeks on average after the start of the wound problem. At follow-up, the wound was covered completely and the gastrocnemius flap was quiet in all patients. The knee prosthesis was preserved in three patients. The prosthesis was revised in one patient, the prosthesis was removed in one patient and an arthrodesis was created in another patient. Most patients had poor clinical and functional Knee Society scores. The poor results in this study, in which a gastrocnemius transplantation was only carried out after a long interval, 11 weeks on average after the occurrence of the wound problem, are in agreement with the poor results reported in the literature of the gastrocnemius flap used at a late stage in a chronically infected total knee prosthesis. On the other hand, the results reported in the literature of the gastrocnemius flap

applied immediately postoperatively, in dehiscence, necrosis or acute infection, are favorable with regard to eradication of the infection, preservation of the prosthesis and function. The periods mentioned in these cases are 2–3 weeks.

Conclusion: Wound healing problems constitute a serious threat to the total knee prosthesis. Timing is important for the success of the muscle flap with preservation of the total knee prosthesis. Application of a gastrocnemius flap should be considered within 2–3 weeks after development of a wound problem.

The uncemented 'APS' total knee prosthesis

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What are the long-term results of the uncemented 'APS' (Allopro of W. Schwägerl) total knee prosthesis? All publications on this subject were authored by the designer of this prosthesis.

Material: A total of 99 knee arthroplasties were performed in the period 1987–1991 in the Department of Orthopedics of the St Franciscus Hospital, Rotterdam. Eligible for follow-up were 76 patients (88 knees). The mean age was 72 years and 84% of these patients were women.

The preoperative diagnoses had been arthrosis deformans in 66 patients and rheumatoid arthritis in 10 patients. At the time of the evaluation (1995), 6 patients (7 knees) had died; 1 patient died 10 days postoperatively from urosepsis and 4 patients 'refused' to co-operate in the examination.

The mean follow-up period was 58 months. The clinical evaluation method applied was the Hospital for Special Surgery knee score¹ (HSS knee score).

At the radiographic follow-up attention was paid to signs of loosening: progressive clear areas or changes of position.

Results: The mean HSS knee score at follow-up amounted to 69. Revision surgery was performed in 15 patients. At radiographic control, 10 knees showed signs of loosening of one of the components.

Conclusion: The follow-up results of this prosthesis after 58 months are disappointing. Consequently, we have stopped using this prosthesis.

Results of manipulation under anesthesia of frozen shoulders

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The treatment of frozen shoulder is difficult; a number of methods have been described. One of these is manipulation of the shoulder joint under anesthesia, of which the results are described.

Material: Manipulation under anesthesia was carried out in the above-named hospital between 1982 and 1992 in 87 patients, 77 of whom (41 females and 36 males with a mean age of 59 years) participated retrospectively in a follow-up study that consisted of physical examination and a questionnaire. In addition, the shoulder function in 62 patients was examined in the outpatient department.

Results: The condition had developed gradually and spontaneously and had been present for longer than 3 months in 75% of the cases. 91% had already undergone some treatment before the redressement (physical therapy, injections, NSAIDs) without any success.

The disorder was bilateral in 9 patients (12%), while 8 patients (10%) had known diabetes.

Calcifications of soft tissues were observed radiographically in 27%.

The redressement failed in two cases and once a transient plexus lesion was seen. The average duration of physical therapy after the treatment was 3.5 months.

Subjectively, 78% of the patients questioned had no or only mild pain after the treatment, while 14% had moderate to severe pain. 72% were of the opinion that their shoulder function was not restricted, while in 19% it was limited above shoulder level and in 9%, below shoulder level as well. 6% had become incapacitated, 7% experienced impairment during occupational activities and 23% at home. The mobility examination revealed normal active function of both shoulders in 75% (n=62). A clear limitation of mobility in one or several directions was seen in 25%.

Conclusion: Manipulation under anesthesia gave good results in the majority of the patients in this group.

Functional treatment of Perthes' disease

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Perthes' disease was first described 90 years ago and still its optimal treatment is not clear. It is even doubtful whether it is at all possible to influence the natural course by any treatment. Children with Perthes' disease were treated in the past in the Wilhelmina Children's Hospital of Utrecht functionally as well as surgically, but in recent years treatment has mostly been only functional. We compared the results of the functional treatment with that of the surgical treatment by means of derotating varus-inducing osteotomy (DVO).

Patients and methods: We made a retrospective study of two groups of children who had been treated in the Utrecht Children's Hospital for Perthes' disease between 1983 and 1991. Minimal follow-up was 4 years, mean follow-up 7 years.

Group A: 18 children with 20 hips received functional treatment. Mean age at diagnosis 5.5 years.

Group B: 18 children with 20 hips were subjected to DVO operation. Mean age 6.5 years.

The results were evaluated according to Stulberg

(Stulberg et al. 1981) and related to the degree of severity of the cephalic necrosis (lateral pillar classification according to Herring et al. 1992).

Results: In both treatment groups we observed that after a mean follow-up of 7 years most hips had a shape compatible with Stulberg II and III. Corrected for the severity of the cephalic necrosis, the results in the two treatment groups are comparable. There was one child with a poor result (Stulberg IV) in the operation group, but she had been 10 years old at the time of diagnosis.

Conclusion: The principal prognostic factors in Perthes' disease are age and degree of severity of the cephalic necrosis. With regard to these factors, there was hardly any difference between the two groups. In this study, the results of functional treatment are the same as that of surgical treatment. This is in accordance with several other studies.

Children with Perthes' disease may in general be given functional treatment.

Treatment of osteoid osteoma with percutaneous CT-guided thermocoagulation

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Osteoid osteomas are rare, benign bone tumors, characterized by a center of highly vascularized osteoblastic tissue (nidus) surrounded by a zone of reactive (sclerotic) bone formation. Protracted pains, often nocturnal, usually respond well to salicylates.

Removal of the nidus 'cures' but may be complicated.

Since February 1994, CT-guided thermocoagulation is used in Leiden as a minimally invasive method of treatment for osteoid osteoma. 45 patients (aged 4–53; femur 20, tibia/fibula 10, pelvis 4, hand 4, humerus/ulna 3, vertebra 2, sacrum 1, foot 1) were subjected under anesthesia to CT-guided (planes 1–2 mm) percutaneous thermocoagulation (heating of the tip of the thermoprobe to 90 °C for 4 minutes); these patients were discharged on the same or the next day, resuming all activities.

The success of the treatment was evaluated clinically and radiologically. There were no complications during or (immediately) after the procedure. One coagulation session was applied in 38 cases, 7 patients underwent a second application because of inadequate results (equipment – needle placement – size); these second applications were successful in 6 of the 7.

At the latest follow-up, 14 patients were free of symptoms after 1–31 months. 4 patients have aspecific residual complaints (no analgetics in 3). 1 patient is awaiting a second thermocoagulation.

It may be concluded preliminarily that percutaneous thermocoagulation is an efficacious treatment of osteoid osteomas.

Treatment of avascular capital femoral necrosis using a pedicled vascularized pelvic chip—clinical and radiological short-term results

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20 patients (26 hips) with capital femoral necrosis (Ficat 2 and 3) have been operated on since 1989 in Our Lady's Hospital of Amsterdam by means of implantation of a pedicled vascularized iliac crest chip.

Material: At the time of writing, 14 patients (18 hips) had a follow-up > 2 years (average 49 months). They were eight males and six females (mean age 36 years). Case history: 5 times use of corticosteroids, 5 times fracture of the femoral neck, once hemoglobinopathy, once alcoholism and twice idiopathic.

Results: Two patients were treated with a total hip prosthesis because of extensive osteoarthritis (33 and 47 months postoperatively). The pain (on a visual analog scale of 0–10) decreased from 4.8 (0–7) before operation to 1.8 (0–6) postoperatively, the Harris Hip Score increased from 68 (23–100) to 89 (72–100). Clinical results were good in 11, fair in four and poor in three cases. The radiographs showed good incorporation of the bone chip. Of the Ficat II hips (n=6), four remained stable, in one, collapse occurred and one developed osteoarthritis. The Ficat III hips (n=12) remained in the same phase eight times, while osteoarthritis developed in four. Only one patient on the MRI scan showed avitality of a bilateral chip.

The necrosis has decreased in size in five femoral heads, remained unchanged in eight and had spread in three. Complications were loss of function of the ulnar nerve in one case due to wrong positioning, and extensive heterotopic ossifications in two cases.

Conclusion: Clinical deterioration was seen in 17% and radiographs showed worsening of the Ficat stage in 33%. The MRI revealed enlargement of the necrosis in only 17%. The clinical and radiological short-term results of the vascularized iliac crest chip technique justify continuation of this procedure and its evaluation in the longer run.

Radiographic evaluation of scoliosis patients treated with a Boston brace

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A total of 301 radiographs of 23 patients with adolescent idiopathic scoliosis treated in the Radboud Hospital of

Nijmegen with Boston brace were examined. The mean radiographic follow-up amounted to 5.3 years. The purpose of the study was evaluation of the evolution of the idiopathic scoliosis before and during brace treatment, in relation to developing vertebral deformities and the growth of the spinal column.

Methods: The co-ordinates, the tilting and the wedge deformation of the individual vertebrae were calculated after digitalization of landmarks on the angular points of the vertebral shadow on standardized antero-posterior radiographs of the spine. The Cobb angle and the length of the spinal column were determined in the same way. Corrections were carried out for the factor of magnification.

Results: The period when brace treatment is indicated, i.e. the period with maximal progression, was round the menarche, during pronounced longitudinal growth of the spinal

column. In the radiographs made within 2 months after the fitting of the brace, the Cobb angle of the thoracic curve showed a correction of 28%. However, in the majority of the population examined, no correction could be observed any longer after 3 years. In five patients, ultimately a Cobb angle was attained of over 20% of the initial value. There was a tendency to increased wedge deformation of the apical vertebrae with wider Cobb angles.

Discussion: Just as in other studies reported, part of the population examined displayed progression of the scoliosis in spite of the brace treatment. The demonstrated wedge deformations of the apical vertebrae suggest a disorder of growth of these vertebrae caused by the scoliosis, and may play a part in this progression. However, considering the rapid increase of certain scoliotic curves, this progression must be influenced by other factors, as well.