

INTEGRATION OF PHYSICAL TRAINING AND HIP SURGERY IN OLD AGE

Ralf Lindholm and Sam Lindholm

*From the Department of Surgery, Vaasa Central Hospital, and from the Department of Surgery,
University of Oulu, Oulu, Finland*

ABSTRACT. Derangement of the hip-joint, causes severe disability and inactivity and is one of the main reasons for surgical rehabilitation in old age. A brief outline is given of the Finnish profile of the situation regarding disorders of the hip-joint in geriatric patients in need of surgery and prolonged institutional care. In a series of 80 patients whose treatment consisted in a regimen of non-stop physical training, with early postoperative mobilization, serious complications were few. By using surgical methods that enable the joint to be loaded and muscular exercise to be instituted without delays by ensuring that the appropriate social measures are taken, the period in hospital can be minimized, as can the ever-increasing need for hospital beds for this category of patients.

The mean age of patients in surgical wards in Finland is approaching that of persons in the long-stay wards, nursing homes and old people's homes. In the internal medical sector there is practically no difference in age between the short and long-stay patients. Orthopaedic and trauma cases make up about one fifth to one third of all patients in the surgical wards of a general hospital, and if the number of ward-days is taken into account the proportion is even higher. A considerable part of the bone and joint disorders is composed of patients undergoing hip-joint operations of one sort or another.

The hip-joint constitutes the locomotory centre in man; it permits movement in practically all directions, is placed lateral to the long axis of the body, and has to withstand heavy loading and frequent movement. In addition, the mobility of the lumbar region is co-ordinated with the hip-joint function, being synchronized with it in such a way that the muscular apparatus that flexes the thigh when the spine is fixed also flexes the trunk when the thigh is fixed.

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INDICATIONS FOR, AND FREQUENCY OF, HIP SURGERY IN OLD AGE

Trauma and degenerative changes constitute the most common indications for operation in the aged. Cases of fracture of the neck of the femur account for a large part of the surgeon's work; at the surgical department of the Vaasa Central Hospital it was the commonest individual fracture in 1957, and likewise in the 1965-66 statistics of hip operations. At the surgical wards of Oulu University Hospital, which have a high percentage of acute cases, fracture of the femoral neck was seventh in order of all traumatic injuries seen in 1964. At the specialized Geriatric Surgical Rehabilitation Department of the Koskela Geriatric Hospital, Helsinki, 54.5 per cent of all patients referred for surgical rehabilitation in 1962-64 were suffering from fracture of the femoral neck or its sequelae (6). Arthrosis of the hip-joint is becoming increasingly common as an indication for operation.

The commonest types of operations on the hip-joint in the aged today are: (I) osteosynthesis of fracture of the femoral neck (Fig. 1), (II) endoprosthesis operation for the fractured femoral neck (Fig. 2), (III) denervation or other soft-tissue operations in cases of arthrosis of the hip, and (IV) osteotomy or similar skeletal operation in cases of hip arthrosis.

RESULTS AND DISCUSSION OF THE INTEGRATED TREATMENT

The results of surgical intervention (Table I) depend significantly on the general condition of the elderly patient and on his or her physical and mental capacity. The biologic changes accompanying advanced age (4) are, as we know, gradual,



Fig. 1. Skiagramme of nailed pertrochanter fracture (McLaughlin).



Fig. 2. Skiagramme of hip-joint in which the head and neck of the femur have been replaced by an endoprosthesis (Austin-Moore).

involving (a) drying-out of the tissues, (b) slowing down of cell division, (c) diminution of oxidative tissue metabolism, (d) cellular atrophy and (e) reduction in the elasticity of the tissues, with degeneration of the elastic tissue; all these processes lead to diminished musculoskeletal stamina and power and strength of reactions, and to deficiencies in the nervous system and sensory organs, and hence to visual and auditory changes and mental disorders. Senile dementia, osteoporosis, hypoproteinaemia and urinary and faecal incontinence are common factors having a negative influence. Premature surgical intervention may lead to general hypofunction, with a sluggish tendency for regression. We are thus obliged to undertake pre-operative rehabilitation or, in other words, to observe Iselin's well-known general principle regarding "delayed emergency" in acute cases, whereby a causal operation is postponed until such time as conditions are optimal for a successful outcome. This in fact amounts to a system that might be called synchronized integrated pre-, intra- and post-operative physiotherapy, with hip surgery.

The science of anaesthesiology teaches us that the surgical risk in acute cases is 30 per cent higher in the aged than in the younger patient, whereas the over-all mortality in planned—as opposed to acute—surgery only slightly exceeds that in younger patients (1, 8). Thus, *pre-operative physiotherapy* comes to occupy a comparatively central position in geriatric surgery—not only ordinary muscular exercise but also breathing exercises aimed at improving cardiovascular and respiratory function and thus diminishing the like-

Table I. Fractures of neck of the femur 1965-66
80 patients, mean age 73½ years

Source: Hospital records, Vaasa Central Hospital, Vaasa, Finland

Mean duration of pre-operative treatment	6.5 days
Mean duration of stay in hospital	25.9 days
Complications	
Thrombo-embolism	2 (2.5%)
Pneumonia	4 (5%)
Deaths	5 (6.2%)



Fig. 3. Patient on the tilting table after femoral neck operation, with the knee fixed in the flexed position in order to avoid putting stress on the nail.

likelihood of thromboembolism, pneumonia and urinary tract complications. It should be administered at the same time as the electrolyte and fluid balance, any diabetes, coronary insufficiency or other internal medical condition being brought under control by medical means.

Intra-operative rehabilitation—if one may call it such—is concerned with respiratory function, and consists of deep insufflations 5 or 6 times an hour under the anaesthetic. The significance of this is that inflation of the alveoli prevents the common alveolar atelectases, with consequent massive condensation of the lung tissue and respiratory insufficiency. This respiratory rehabilitation is continued throughout the operation. It is physiologically analogous to the spontaneous deep breaths taken at about the same frequency during both sleeping and waking hours.

Efforts to get the patient walking again soon after the operation without the fear of the wound rupturing are imperative. Immediate post-operative breathing exercises (2), muscle training and raising into a vertical position by means of a tilting table are calculated to maintain optimal respiratory, vascular and muscle tone. It is possible for a patient to be walking with living aids only 24 to 48 hours after an endoprosthesis operation. The older post-endoprosthesis operation patient can be walking at the bar, and before long on crutches, at the latest when the stiches are removed.

Where osteosynthesis of a medial fracture of the neck has been carried out the situation is slightly more difficult, and it is important not to apply loads at too early a stage. When tilting it

may therefore be advised to fix the knee in the flexed position and relieve the limb of any load (Fig. 3). In every case, ambulation in the wheelchair is an excellent form of remedial exercise.

Where surgery is performed for arthrosis the prospects of early loading are comparatively good, since it is rare for the operation to affect the skeletal structure and supporting capacity of the hip-joint.

The rehabilitation of an elderly person who has had an operation on the hip-joint requires a great deal of genuine psychologic expertise in an effort to assist the patient to overcome the physical and mental difficulties involved. The stage at which self-help is possible and a positive attitude is adopted is frequently preceded by a period of depression arising from the patient's uncertainty of his ability to manage the affairs of daily living. It is at this point that the *social services* enter the picture and, by promoting contact between the patient and his home environment, create the confidence required. Even though it is not always possible to achieve the final goal of geriatric rehabilitation—discharge home—one should realise and remember that improvements in ward technology within the walls of the institution are worth striving for, and not least on humanitarian and economic grounds, and that passivity leads to an ever increasing call for hospital beds (3).

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Address for reprints:

Ralf Lindholm, M.D.
Kirurgiska kliniken
Oulu Universitet
Oulu, Finland

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