

## Anders Hulth 70 years



Anders Hulth was raised and educated in an academic environment in Uppsala, Sweden, where his father was head of the university library. After graduating from medical school, Anders Hulth took his specialist training in surgery and subsequently became a "Vollchirurg", the typical product of the Uppsala Department of Surgery at that time. This type of surgeon had little need for subspecialties, and definitely not for orthopedics: his teachers were Gunnar Nyström in Uppsala and Sven Johansson in Gothenburg – both pioneers in fracture surgery, notably the treatment of fractures of the femoral neck. In his training, clinical work and research Anders Hulth was associated with professors such as Robin Fåhræus in pathology and contemporaries including Bengt Engfeldt, Gunnar Nylander, Sven Olerud and Olle Westerborn – all who were to become prominent in Swedish surgery and medical research.

Anders Hulth began his scientific career fairly late in life – his medical science doctorate thesis was presented in 1956. It described a se-

ries of intravenous phlebographies in patients with cervical hip fracture and was the first successful attempt to reproduce Astley Cooper's cadaver injection technique in patients. Although his method had certain drawbacks, Hulth provided a morphologic basis for kinetic isotope studies simultaneously introduced by Tucker for predicting the prognosis in cervical hip fracture. The investigators in the 1950's of this fracture were forerunners of measurements of intraosseous pressure, uptake and disappearance of radioactive and other tracers, as well as other methods that became available with technologic progress.

Over the years, Anders Hulth has returned to the vascularity of the femoral head in several studies, in which he has employed a number of different techniques. However, he has also explored a totally different field: namely, the effect of various enzymes on the growth of cartilage and bone. In his studies of the effects of radiation, cortical steroids, and a variety of other agents on the physis cartilage, he was the first to use tetracycline labels.

Table 1. Orthopedic Department in Malmö (1941–1964 chairman Sophus von Rosen, 1964–1981 chairman Anders Hulth).

	1941	1964	1981
Number of beds	46	156	130
Patients admitted	358	1,779	3,347
Operations on patients admitted	153	1,323	3,917
Wards	1	5	5
Clinic Visits	?	37,500	65,000
Operations in ambulatory patients	201	1,197	1,602
Staff Surgeons	2	9	21
Registered Nurses	3	22	40
Physical Therapists	0	7	13
Secretaries	0	7	30
Total number of employees	?	150	229

With this interest in the physiology of the locomotor system, it is not surprising that Anders Hulth in the late fifties was recruited by Carl Hirsch, at that time head of orthopedics in Uppsala. After additional training in Uppsala and a two-year sojourn in Gothenburg, Anders Hulth was appointed head of the Department of Orthopedic Surgery at Malmö General Hospital in 1965 which three years later was combined with a professorship at Lund University.

During his sixteen years as chairman in Malmö, the demand for orthopedic care increased tremendously (Table 1) as the new arthroplasties were introduced and the number of fractures doubled in the aging population. Anders Hulth subspecialized his expanding department to deliver the care demanded by the public without stifling the capacity for research. By design, as well as by necessity, the research was focused on clinical problems, but a sector of orthopedically oriented basic research was maintained and strengthened. As a measure of his success, almost thirty M. D. science theses were presented during his period of office, and hundreds of papers were published in international journals.

Beside his administrative duties, Anders Hulth maintained his surgical practice and continued his own research. An important contribution was his experimental model for pro-

ducing arthrosis in rabbits, which has been adopted by many investigators. With this model and a variety of histomorphologic and chemical techniques, Anders Hulth and his co-workers were able to study the earliest changes in degenerative cartilage.

The latest issue to which Anders Hulth has addressed himself is that of immunology and the importance of immunologic mechanisms for fracture healing and other cell differentiation events, including signs of immunologic response in arthrosis. This chapter in the career of Anders Hulth just seems to have begun.

When the ideologies of the early sixties somewhat abruptly found their way into Swedish health politics, the outcome in some instances was so extraordinary that many felt that something had to be done. Now, Anders Hulth took a stand not only for orthopedics but, on the whole, for the rights of the elderly to obtain treatment of life-threatening or severely incapacitating conditions in competition with a fairly healthy segment of the population who were consuming preventive primary care of questionable worth. For some years deeply involved in the public debate, Anders Hulth showed high courage and was to become respected also by those who were not always sympathetic to his opinions.

It would be easy to become envious of Anders Hulth, a man who went to medical school in the thirties, early enough to enjoy some of the legendary teachers; a dedicated physician who has had a distinguished career in both general and orthopedic surgery; a scientist who has managed to become deeply involved in at least four fields of medical research; a teacher and scholar who has had a distinguished academic career crowned with a highly successful mandate as professor and chairman of an orthopedic department; and a senior citizen and gentleman who after retirement is still active and successful in his research, and continues to play and enjoy the piano. It could not have happened to a nicer fellow!

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## Bibliography

- Hulth, A. (1953) Injection of contrast medium in the head of the femur at intracapsular fractures of the neck of the femur. A method of studying the remaining vascular supply of the capital fragments. *Acta Soc. Med. Upsal.* **59**, 41–51
- Hulth, A. (1956) Intra-osseous venographies of medial fractures of the femoral neck. The residual vascularity of the head fragment in different types of fractures and its relation to the prognosis. M. D. Thesis. *Acta Chir. Scand.* Suppl. 214.
- Hulth, A. (1956) Intra-osseous venographies of medial fractures of the femoral neck... (Author's abstract). *Acta Chir. Scand.* **111**.
- Hulth, A. (1958) The growth inhibiting effect by up-pain on young rabbits. *Acta Orthop. Scand.* **27**, 167–172.
- Hulth, A. (1958) The vessel anatomy of the upper femur end with special regard to the mechanism of origin of different vascular disorders. *Acta Orthop. Scand.* **27**, 192–209.
- Hulth, A. (1958) Experimental retardation of endochondral growth by papain. *Acta Orthop. Scand.* **28**, 1–21.
- Hulth, A. (1958) Circulatory disturbances in osteoarthritis of the hip. A venographic study. *Acta Orthop. Scand.* **28**, 81–89
- Hulth, A. (1958) Femoral-head phlebography. A method of predicting viability. *J. Bone Joint Surg.* **40-A**, 844–852
- Hulth, A. & Westerborn, O. (1959) Influence of some plant enzymes on epiphyseal cartilage. *Acta Orthop. Scand.* **29**, 1–9
- Engfeldt, B., Hulth, A. & Westerborn, O. (1959) Effect of papain on bone. I. A histologic, autoradiographic and microradiographic study on young dogs. *Arch. Path.* **68**, 600–614.
- Hulth, A. & Westerborn, O. (1959) Experimental production of dwarfs in rabbits with papain. *Exp. Cell. Res.* **17**, 543–547.
- Hulth, A. & Westerborn, O. (1959) The effect of crude papain on the epiphyseal cartilage of laboratory animals. *J. Bone Joint Surg.* **41-B**, 836–847.
- Engfeldt, B., Hulth, A. & Westerborn, O. (1959) Inverkan av olika växtenzym på växande brosk. Riksföreningen mot cancer. *Årsbok 1957–1959*, 117–120.
- Hulth, A. & Westerborn, O. (1960) Early changes of the growth zone in rabbit following roentgen irradiation. *Acta Orthop. Scand.* **30**, 155–168.
- Hulth, A. & Olerud, S. (1960) Disuse of extremities. I. An arteriographic study in the rabbit. *Acta Chir. Scand.* **120**, 220–226.
- Hulth, A. & Olerud, S. (1961) Disuse of extremities. II. A microangiographic study in the rabbit. *Acta Chir. Scand.* **120**, 388–394.
- Hulth, A. & Högström, S. (1961) Bestämning av pO<sub>2</sub> och pH i ven- och artärblod hos amputerade. *Nord. med.* **66**, 1136–1137.
- Hulth, A. & Olerud, S. (1961) Läkning av amputationstumpar på kaniner. *Nord. med.* **66**, 1137–1138
- Hulth, A. (1961) Osteotomi vid komplikationer till medial collumfraktur. *Nord. med.* **66**, 1139–1140.
- Hulth, A. (1961) The inclination of the fracture surfaces and its relation to the rate of healing in femoral neck fractures. *Acta Chir. Scand.* **121**, 309–314.
- Hulth, A. & Olerud, S. (1961) Disuse of extremities. III. A histological and microradiographical study of the epiphyseal cartilages of the distal tibia and calcaneus in young rabbits. *Acta Chir. Scand.* **121**, 338–343.
- Hulth, A. (1961) Necrosis of the head of the femur. A roentgenological, microradiographic and histological study. *Acta Chir. Scand.* **122**, 75–84.
- Hulth, A. & Johansson, S. H. (1962) Femoral-head venography in the prognosis of fractures of the femoral neck. *Acta Chir. Scand.* **123**, 287–297.
- Erikson, U. & Hulth, A. (1962) Circulation of amputation stumps. Arteriographic and skin temperature studies. *Acta Orthop. Scand.* **32**, 159–170.
- Hulth, A. & Westerborn, O. (1962) Early changes of the growth zone in the rabbit following roentgen irradiation: Autoradiographic investigation after the administration of radiosulphate. *Brit. J. Exp. Path.* **43**, 137–141.
- Hulth, A. & Olerud, S. (1962) Studies on amputation stumps in rabbits. *J. Bone Joint Surg.* **44-B**, 431–435.
- Hulth, A., Norberg, I. & Olsson, S.-E. (1962) Coxa plana in the dog. A preliminary report of a clinical, roentgenographic, histological and microradiographic study. *J. Bone Joint Surg.* **44-A**, 918–930.
- Hulth, A. & Olerud, S. (1962) Tetracycline labelling of growing bone. *Acta Soc. Med. Upsal.* **67**, 219–231.
- Hulth, A. & Nylander, G. (1962) Effect of thyroxin and propyl thiouracil on the epiphyseal cartilage in growing rats. A histologic and autoradiographic study. *Acta Soc. Med. Upsal.* **67**, 273–284
- Hulth, A. & Westerborn, O. (1963) Early changes of epiphyseal cartilage following immobilization. A histologic and autoradiographic study. *J. Trauma* **3**, 235–242.

- Hulth, A. & Olerud, S. (1963) The effect of cortisone on growing bone in the rat. *Brit. J. Exp. Path.* **44**, 491–496.
- Erikson, U., Graf, K., Hulth, A. & Ström, G. (1963) Gåskolan i Uppsala. *Socialmed. T.* **60**, 19–24.
- Hulth, A. & Westerborn, O. (1963) Effect of cortisone on the epiphyseal cartilage. A histologic and autoradiographic study *Virchow Arch. Path. Anat.* **336**, 209–219.
- Hulth, A. & Nylander, G. (1963) The effects of thioracil on growing cartilage in the rat. *Virchow Arch. Path. Anat.* **336**, 580–591.
- Bergquist, E. & Hulth, A. (1963) A study of newly formed bone in lathyritic rats. Microradiographic, tetracycline labelling and microangiographic techniques. *Virchow Arch. Path. Anat.* **337**, 195–204.
- Hulth, A. & Olerud, S. (1964) Early fracture callus in normal and cortisone treated rats. A study by a combination of tetracycline labelling, microangiography and microradiography. *Acta Orthop. Scand.* **34**, 1–23.
- Hulth, A. & Olerud, S. (1965) The reaction of bone to experimental cancer. *Acta Orthop. Scand.* **36**, 230–240.
- Hulth, A. (1965) Prediction of the viability of the femoral head in femoral neck fractures. A survey of different predicting methods. *Acta Chir. Scand.* **129**, 72–80.
- Hulth, A. & Olerud, S. (1965) The healing of fractures in denervated limbs. An experimental study using sensory and motor rhizotomy and peripheral denervation. *J. Trauma* **5**, 571–579.
- Hulth, A. (1965) Formation of new bone in osteolathyrism. An radiographic investigation, using  $S^{35}$  and  $H^3$  thymidine. *Virchow Arch. Path. Anat.* **339**, 371–378.
- Hulth, A. & Johansson, S. (1966) Structural changes of the femoral head in cases of non-union of the femoral neck. *Virchow Arch. Path. Anat.* **340**, 320–329.
- Hulth, A. & Semb, H. (1966) Acid-base status of the intramedullary blood in immobilized extremities. A preliminary report. *Acta Orthop. Scand.* **37**, 117–121.
- Hulth, A. & Semb, H. (1966) Experimental acid-base status and oxygen tension in marrow blood from the diaphysis and metaphysis of the tibia. *Surg. Gynec. Obstet.* **122**, 1–5.
- Hulth, A. (1966) Intraosseous methods for predicting the viability of the femoral head. SICOT, X<sup>e</sup> Congress, Paris, 72–79.
- Hulth, A. (1967) Prognostische Untersuchungen zur Lebensfähigkeit des Schenkelkopfes nach Schenkelhalsfrakturen. *Aktuelle Chir.* **2**, 375–380.
- Hulth, A. & Lindberg, L. (1968) Effect of actinomycin D on epiphyseal plate of mice. A histological and  $^{35}S$ -autoradiographic study. *Acta Path. Microbiol. Scand.* **73**, 177–182.
- Hulth, A. (1968) Radiologische Prognostik der Knochenheilung. *Handbuch der medizinischen Radiologie*. Band IV/I, 617–632. Editor: L. Diethelm.
- Hulth, A. (1968) A survey of recent scientific research. Thule International Symposia 1–3 Oct. Skandia, Stockholm: 285–300.
- Hernborg, J. & Hulth, A. (1968) Blood circulation in osteoarthritic joints. *J. Bone Joint Surg.* **50-B**, 227.
- Hulth, A. & Nilsson, B. (1969) Effect of actinomycin-D on bone mineral metabolism in rats. *Calc. Tiss. Res.* **3**, 194–197.
- Hulth, A. (1970) Intraosseous phlebography and tracer injections in femoral neck fractures. *Angiology* **21**, 413–420.
- Hulth, A. (1970) Collumfraktur. *Lundaforskare föreläser* **2**, 114–131, Gleerups.
- Hulth, A., Lindberg, L. & Telhag, H. (1970) Experimental osteoarthritis in rabbits. *Acta Orthop. Scand.* **41**, 522–530.
- Hulth, A., Lindberg, L. & Telhag, H. (1972) Mitosis in human osteoarthritic cartilage. *Clin. Orthop.* **84**, 197–199.
- Hulth, A. (1972) Behandling av extremitetsskadade amerikanska soldater från Vietnam. *Läkertidningen* **69**, 601–608.
- Bauer, G. & Hulth, A. (1973) Kompressionsosteosyntes enligt AO vid underbenets diafysfrakturer bör överges. *Läkertidningen* **70**, 4752–4753.
- Buring, K., Hulth, A., Nilsson, B., Westlin, N. and Wiklund, P. E. (1974) Treatment of osteoporosis with vitamin D. *Acta Med. Scand.* **195**, 471–472.
- Havdrup, T., Hulth, A., & Telhag, H. (1975) Scattered mitoses in mature joint cartilage in rabbits after local trauma. A chalone effect? *Clin. Orthop.* **113**, 246–248.
- Hulth, A. (1975) Reformera sjukvårdsreformerna. *Sydsvenska Dagbladet* 30/11.
- Carlsson, Å. & Hulth, A. (1976) Leukocyte and serum alkaline phosphatase after hip arthroplasty, synovectomy of the knee and fracture. *Clin. Orthop.* **114**, 265–269.
- Havdrup, T., Hulth, A. & Telhag, H. (1976) The subchondral bone in osteoarthritis and rheumatoid arthritis of the knee. *Acta Orthop. Scand.* **47**, 345–350.
- Hulth, A. & Johnell, O. (1976) Cell proliferation in the bone marrow and thymus following partial bone marrow aspiration. *Experientia* **32**, 1577.

- Hulth, A. & Johnell, O. (1976) Cell proliferation in the bone marrow and thymus following fractures in rats. *Clin. Orthop.* **120**, 260–263.
- Hulth, A. (1976) Den ökade sjukfrånvaron – ett hälsotecken? *Läkartidningen* **73**, 4157–4158.
- Johnell, O. & Hulth, A. (1977) Proliferation of osteoclasts in rat bone following bleeding and femoral fractures. *Calc. Tiss. Res.* **23**, 241–244.
- Hulth, A. (1977) Distriktsläkarkrisen. *Läkartidningen* **74**, 4653–4654.
- Bauer, G. & Hulth, A. (1977) Rexed har fel om forskningen. *DN debatt* 2/2.
- Johnell, O., Wiklund, P.-E. & Hulth, A. (1977) Osteoclast counting in crista biopsies. *Acta Orthop. Scand.* **48**, 566–571.
- Hulth, A. & Johnell, O. (1978) Proliferation of bone marrow and thymus cells and increased osteoclastia after antigenic challenge in rats. *Acta Orthop. Scand.* **49**, 240–243.
- Hulth, A. & Johnell, O. (1979) Parathyroid hormone secretion after operative bone trauma *Acta Orthop. Scand.* **50**, 241–243.
- Hulth, A. (1979) En hypotes om konkurrerande läkningsfaktorer. *Läkartidningen* **76**, 3047–3048.
- Hulth, A., Nilsson, B., Westlin, N. & Wiklund, P. E. (1979) Alkaline phosphatase in women with osteoporosis. *Acta Med. Scand.* **206**, 201–203.
- Hulth, A., Nilsson, B., Westlin, N. & Wiklund, P. E. (1979) Bone biopsy in women with spinal osteoporosis. *Acta Med. Scand.* **206**, 205–206.
- Johnell, O. & Hulth, A. (1979) The effect of single and double trauma on the mitotic activity of bone marrow and thymus. *Acta Chir. Scand.* **145**, 73–75.
- Hulth, A. (1979) Dölj inte de sociala problemen under medicinska etiketter. *Läkartidningen* **76**, 920–921.
- Hulth, A. (1979) Socialt alternativ till sjukskrivning bättre än att utvidga sjukdomsbegreppet. *Läkartidningen* **76**, 167–168.
- Hulth, A. (1979) Låt politikerna ta ansvaret. *Läkartidningen* **76**, 2263.
- Hulth, A. (1980) Ideologier härjar inom sjukvården. Nedrustning hotar akutvården. *DN debatt*, 8/7.
- Hulth, A. (1980) Hjälper oss alltid helhetssynen? Sjukvården fel forum för sociala problem. *Läkartidningen* **77**, 2970–2971.
- Hulth, A. (1980) Ge hellre kuratorn lite medicinsk utbildning. *Läkartidningen* **77**, 4355.
- Hulth, A. (1980) Specialister bör utföra protesutbytesoperationer. *Läkartidningen* **77**, 2576.
- Hulth, A. (1980) Fracture healing. A concept of competing healing factors. *Acta Orthop. Scand.* **51**, 5–8.
- Johnell, O. & Hulth, A. (1980) The response of bone marrow cells, thymocytes and osteoclasts to hydrocortisone. *Brit. J. Exp. Pathology* **61**, 411–414.
- Hulth, A. (1981) Fracture healing – more biology than mechanics. Letters to the Editor. *Clin. Orthop.* **156**, 259–260.
- Hulth, A., Johnell, O. & Willner, S. (1981) The effects of scoliosis surgery on parathormone, calcitonin and calcium levels in serum and the urinary excretion of calcium. *Internat. Orthopaedics (SI-COT)* **5**, 139–141.
- Hulth, A. (1981) Malmö och de gamla. *Sydsvenska Dagbladet* 18/3.
- Hulth, A. (1981) Det har gått troll i begreppet total-syn. *Läkartidningen* **78**, 1163.
- Hulth, A. (1981) Prevention och sjukvårdskostnader – storvinsten finns inte runt hörnet. *Läkartidningen* **78**, 114–115.
- Hulth, A. (1982) Experimental osteoarthritis. A survey. *Acta Orthop. Scand.* **53**, 1–6.
- Güngör, T., Hedlund, T., Hulth, A. & Johnell, O. (1982) The effect of irradiation on osteoclasts with or without transplantation of hematopoietic cells. *Acta Orthop. Scand.* **53**, 333–337.
- Hedlund, T., Hulth, A. & Johnell, O. (1982) The early effects of EDTA, colchicine and azetazolamide on the number of osteoclasts and the calcium<sup>3</sup> in rats. *Acta Orthop. Scand.* **53**, 753–756.
- Hulth, A. (1982) Artrossjukdomen – etiologi och förlopp. *Läkartidningen* **43**, 3895–3896.
- Hulth, A. (1982) Den öppna vården i Malmö. *Sydsvenska Dagbladet*, 16/12 och 17/12.
- Hulth, A. (1983) Kan antalet amputationer minska? *Läkartidningen* **80**, 4014–4015.
- Hulth, A. (1983) Fel acceptera höftledsartrosen som arbetsskada. *Läkartidningen* **80**, 1675.
- Hulth, A. (1983) Specialistvård kontra allmänläkarvård – realism eller ideologi. *Svensk kirurgi* **41/2**, 11–13.
- Klareskog, AS., Johnell, O., Hulth, A., Holmdahl, R. & Rubin, K. (1986) Reactivity of monoclonal anti-collagen II antibodies with cartilage and synovial tissue in rheumatoid arthritis and osteoarthritis. Accepted for publication in *Arthritis and Rheumatism*.
- Johnell, O., Hulth, A. & Henricson, A. (1985) T-lymphocyte subsets and HLA-DR-expressing cells in the osteoarthritic synovialis. *Scand. J. Rheumatol.* **14**, 259–264.
- Hulth, A., Johnell, O., Klareskog, L. & Henricson, A. (1985) T-lymphocytes and Ia-expressing cells in fracture healing in rats. *Int. J. Immunotherapy* **1**, 103–106.

- Hulth, A. (1985) The femoral head – dead or alive. Guest Editorial. *Acta Orthop. Scand.* **56**, 193–195.
- Hulth, A., Johnell, O. & Sjögren, H. O. (1986) Retardation of cancer growth in rats subjected to femur fractures. Accepted for publication in *European Surgical Research*.
- Klareskog, L., Johnell, O. & Hulth, A. (1984) Expression of HLA-DR and HLA-DQ antigens on cells within the cartilage-pannus junction in rheumatoid arthritis. *Rheumatol. Int.* **4**, 11–15.
- Hulth, A., Johnell, O. & Henricson, A. (1986) The appearance of cells expressing Ia-antigen and different subsets of T-lymphocytes in experimental fracture healing. A study of the differentiation of callus tissue. Submitted for publication in *Clin. Orthop.*