



# Preface

Much has been written about changes in medicine – mankind has gone through – changes which influenced the development of medical speciality decisively and surely many more changes will continue to take place in coming years.

Obviously only some of the advances in the treatment of fractures and degenerative diseases of the human motor system may be regarded as milestones in the development of orthopaedic and trauma related surgery. Major advances have been made specially in the treatment of femur fractures over the last five decades. There is no doubt that one milestone in the middle of the last century can be attributed to Ernst Pohl, a genius engineer from Kiel, who developed the first sliding device for osteosynthesis of hip fractures. He opened a new area in the field of conventional hip joint reconstruction, consequently embettering and developing an implant system, enabling the patient to walk with full weight bearing at an early time, reducing complications decisively and functional deficits to a minimum.

Our book deals with trauma surgery at the hip joint and it includes all kinds of fractures from the femoral neck area as well as the intertrochanteric and the subtrochanteric area. We know that there is no single method of treatment existing which could be used adequately for all type of fractures at the proximal femur. We believe on the other side that with the development of the DMS since 1993 and the experiences we have made personally with the new implant a spectrum of indications for its implantation has been opened which is broader than the spectrum of many other implants which are used for fracture fixation at the hip. This does not mean that we belong to the type of surgeons who claim that one could use a single implant for all type of fractures. It is obvious that the better option is to use the best implant for an existing problem. We have made the attempt to give a tailor-made solution for treatment of joint localised fractures at the femur. Our experience over 15 years show that a great number of problems can be solved with the DMS under the special aspect of its unique adjustability and anatomical congruence.

Every year publications about fractures at the proximal femur present new biomechanically embettered or described ideal implants. Mostly ideal fractures with ideal results are presented by expelling the results about problems, complications and implant failures. That's why we have included in the book several chapters which are dedicated to problem cases and pathological fractures for which the surgical management is controversially discussed until our days.

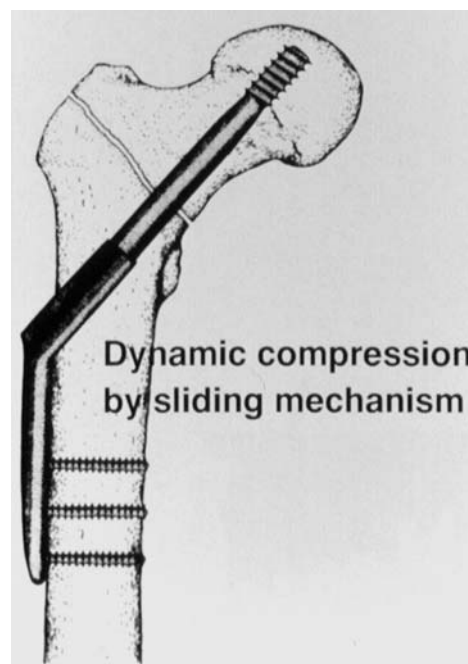
The book finally includes chapters about perioperative antibiotic therapy, thrombo-embolism prophylaxis, postoperative physiotherapy and osteoporosis management. We have written our book for colleagues who are working in trauma surgery and we hope that we have fulfilled the demands of objectivity. The reader should treat our attempt with leniency.

# Introduction

K.-K. DITTEL

The history of non-locking implants in fracture treatment began in 1944. It was the year when the mother of the engineer Ernst Pohl (1876–1962) died after having suffered a proximal femur fracture which was treated conservatively over several weeks by traction and immobilization. From this moment the instrument maker Pohl worked to construct an implant which could allow stable fracture fixation, early mobilization and the best conditions for fracture healing in a rapid time frame. He is given credit for having developed the first non-locking connection between an intramedullary force carrier (lag screw) and a lateral anchoring plate (barrel plate) (Fig. 1).

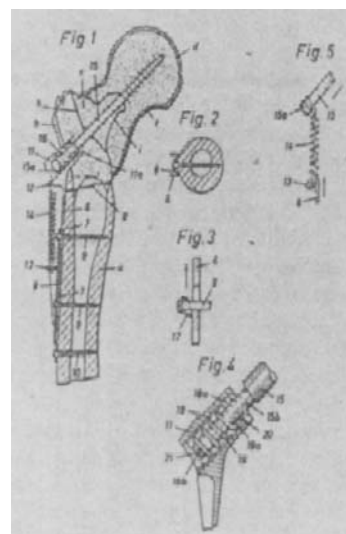
The principle consists in a dynamic connection between an intramedullary femur head screw and a femur plate that allows self compression (sliding link principle). This new concept made it possible to minimize many of the previous complications such as head perforation, pseudarthrosis and secondary displacement of fracture fragments.

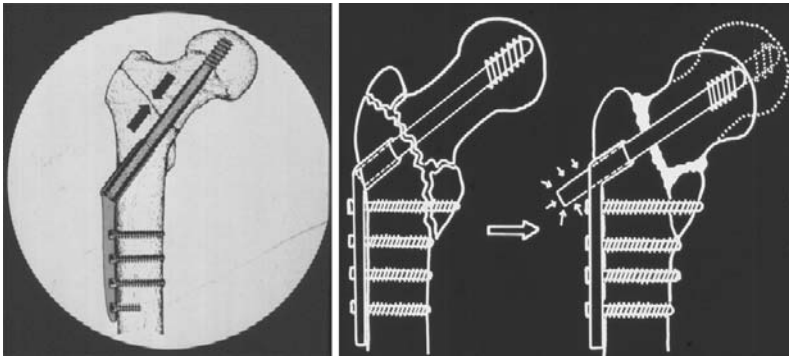


**Fig. 1.** Pohl sliding cylinder – plate system.



**Fig. 2.** Dr. med. h.c. Ernst Pohl and the draft of the patent of Pohl system 1951.





**Fig. 3.** The sliding link principle, realization of an ingenious idea.

First publication abroad: A New Principle in the Treatment of Trochanteric Fractures of the Femur. W. Schumpelick und P.M. Jentzen (1955) In: The Journal of Bone and Joint Surgery: Vol 37 A; 693.

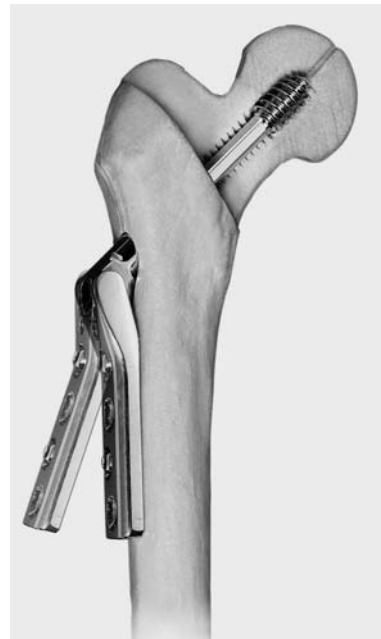
His ideas led to the first patent on the 7th of December 1951 under the claim: “connecting implant for joint orientated fractures” (Fig. 2).

The final acceptance of his revolutionary way to improve healing of hip fractures was difficult. It was delayed by antipathy and technical problems. The engineering and orthopaedic technique were developed and completed because of the dedication of this young craftsman. An era of especially fruitful cooperation between surgery and craftsmanship had started. The decisive influence of Pohl’s system is obvious in many of the devices used in modern traumatology. The revolutionary impact that this development would have on hip fracture treatment could not have been imagined at that time. The number of patients over a period of five decades and longer who have had a proximal femur fracture treated successfully with the sliding barrel principle is unknown. In the future, Pohl’s idea will provide for the survival of many more (Fig. 3).

An optimized follow-up model was developed by the AO (1979) on the basis of Pohl’s system. While maintaining the “sliding barrel principle”, additional rotational stability is ensured by form-fit (i.e. by using a hexagonal screw instead of a round one) and flattening the barrel on two sides to provide corresponding sliding surfaces.

Difficulties can be expected in patients with fractures at the coxal part of the femur when high age, osteoporosis and multimorbidity are together present. The type of fracture is considerably influenced by the grade of osteoporosis. Usually, quality and quantity are mutually ex-

cluding poles. However they must be brought to compatibility and respect the special problems of the fractures of the proximal femur in the elderly. The changing age structure of the population in Germany is leading to a disproportional increase of these fractures. According to statistical data from State and Private Health Insurance companies in Germany 150.000 persons per year who are older than 65 years suffer fractures in the hip joint area which subsequently require



**Fig. 4.** Angle adapted adjustment of the Dynamic Martin Screw.

surgical treatment. Besides the form of fracture the choice of the implant may also imply relevant complications and influences the outcome and the ability of the single patient decisively.

Basics for operative treatment of proximal and distal femur fractures:

- Clear surgical indication
- Short planning and preparation < 24 h
- Full weight bearing osteosynthesis
- Early mobilisation and physiotherapy

In comprehensive form the book presents the usage of a meanwhile well installed implant (DMS) for osteosynthesis technique in the peritrochanteric region. The “double dynamic” stabilization (sliding tongue principle and angle adapted contoured fit) means a state of the art

fracture treatment procedure. It is a convincing alternative to achieve a biological osteosynthesis at the femur. The system includes an infinitely adjustable, flexible angle, dynamic plate with a tubular distal part. The dynamic hip plate enables an intraoperative valgus correction of the head neck fragment by the worm gear mechanism before the compression of pertrochanteric surfaces of the fracture is achieved without a removal of the implant. Because the DMS system includes the ability to be adapted to any desired angle it is not only an individual implant but also a universal implant for use at the proximal femur as well for the stabilization of fractures in the distal part of the femur. By the angle adapted adjustment complications can be reduced because tension forces are transmitted to pressure forces in the fracture area (Fig. 4).



The Double Dynamic Martin Screw (DMS)  
Adjustable Implant System for Proximal and Distal  
Femur Fractures

Dittell, K.-K.; Rapp, M.J. (Eds.)

2008, XIX, 191 p., Hardcover

ISBN: 978-3-7985-1841-4