

Daniel Zarzycki

Spine surgery in the 75 years of Polish Orthopaedic and Traumatology Society

SUMMARY

In the study the development of spine surgery in Poland since the beginning of XXth century was described. Author concentrated on leading Polish orthopedists, who laid fundamentals of today's polish spondyloorthopaedics. First in polish magazines two diseases dominated: tuberculosis of spine and scoliosis. Dynamic development of polish spine surgery characterized years after Second World War. From Gruca springs applied for idiopathic scoliosis, through Harrington method, polish BW-2 tool and Luque rods polish orthopedists did not deviate from world standards. Then techniques of three-plane spine correction – Cotrel-Dubousset instrumentation and polish system DERO were introduced. Next step was passing from spondylodesis to arthroplasty through application of artificial cervical and lumbar discs.

Before 1928 doctors interested in orthopaedic surgery had little opportunity to exchange views on a larger scale.

Congresses of Polish surgeons were overloaded with general surgery topics, so not enough time was left for discussing problems of the subspecialties. There was also a dearth of publications on orthopaedic surgery. In a bibliography of orthopaedic literature from 1900 to 1930 compiled by Franciszek Raszeja and published in „Chirurgia Narządów Ruchu” in 1932 [13], only 31 of 603 publications dealt with diseases of the spine. Since the foundation of the Polish Society of Orthopaedics and Traumatology in 1928, throughout the inter-war period and even shortly after the Second World War, most of Polish and foreign orthopaedic writing was about two disease entities: tuberculosis of the spine and scoliosis. I use the term „scoliosis” because, at that time, congenital and idiopathic scoliosis was not distinguished, as can be gleaned from publications by Rutkowski (1925) „Habitual scoliosis” [15] and Wierzejewski (1928) „Does habitual lateral spine dislocation exist?” [16]. The first attempt at distinguishing and systematizing these diseases was Wierzejewski's 1922 habilitation thesis „On Congenital Changes in the Spine”.

F. Albee is considered the father of world spine surgery. In 1911 he published early results of surgical treatment of tuberculosis of the spine, for which purpose he used solid bone grafts from the tibia. To promote bone fusion, the bone graft was put between

cleft spinous processes of vertebrae. This method was also recognized as useful in the treatment of scoliosis [1].

In Poland, this technique was introduced by Wierzejewski in Poznań, Gruca in Lwow and Zaremba in Kraków. In an effort to reduce the number of complications, Wierzejewski modified Albee's method by placing the bone grafts along the spine, without cleaving processes. The results of the first eight operations according to his own modified method were published in „Zeitschrift fur Ortopadische Chirurgie” in 1913.

Several years later, in 1929, Zaremba from Kraków published „Critical remarks on Albee's method in spine tuberculosis” and this was one of the first publications in our journal [18].

The earliest attempts to treat spine diseases from an anterior approach, in Western literature, were published in the 1920's. In Australia in 1928 Royle described the first removal of a hemivertebra by anterior approach [14]. In the USA in 1933 Lacum and De Forest-Smith described resection of vertebral bodies in the surgical treatment of congenital scoliosis [18].

Treatment of spine deformities from an anterior approach was not practised in Poland in the inter-war period.

As A. Gruca wrote, the end of World War II „... put Polish orthopaedics in the face of almost superhuman challenges.... About 40% of Polish orthopaedists had perished in the war, hospitals were devastated, there was a lack of hospital beds and the sim-

plest equipment. The difficulties seemed almost insurmountable...” [9]. Despite so many problems, the afterwar period was characterized by dynamic development of Polish spondyloorthopaedic surgery, enabled a new view and a search for the more effective methods for solving problems of spine pathology. Gruca, Wajsflog, Wierusz, Malawski, Tylman, Świderski and others deserved considerable credit for what was achieved.

In the afterwar period the main goal of spine surgeons was to seek construction solutions for adequate correction and stabilization of the spine. A. Gruca was a pioneer in this area in the world. In 1956 he used springs in the treatment of scoliosis (Fig. 1). Indications for this treatment included grade 1 and 2 pro-

gressive idiopathic scoliosis. Gruca published the results of treatment in internationally acclaimed magazines such as: *JBJS*, *Revue de Chir.Orthop* [6,7,8] and many others. He also popularized his method in the USA, where he operated on several patients himself.

At the Orthopaedic Department in Poznań, this method was introduced by Król in 1961. In 1956 Król in Poznań used the Marino-Zucco tool to correct scoliosis in several patients (Fig. 2). The range of operations performed in Poland at that time did not lag behind world standards in spine surgery.

The introduction of Harrington instrumentation in 1958 represented an important turning point in spine surgery (Fig. 3). Harrington published his prelimina-

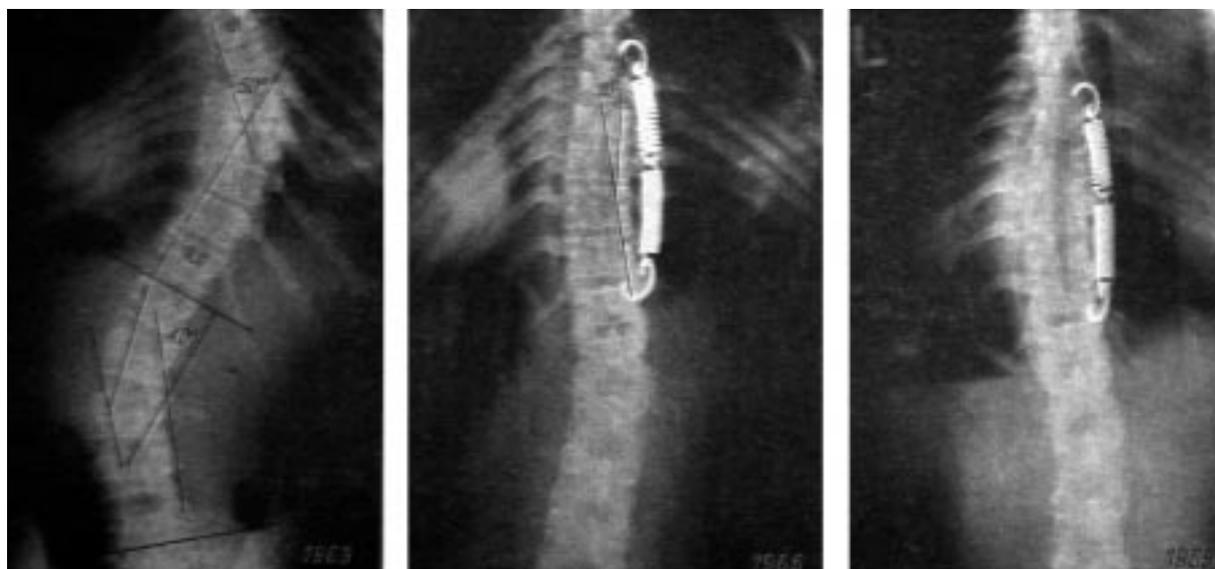


Fig. 1. Gruca spring

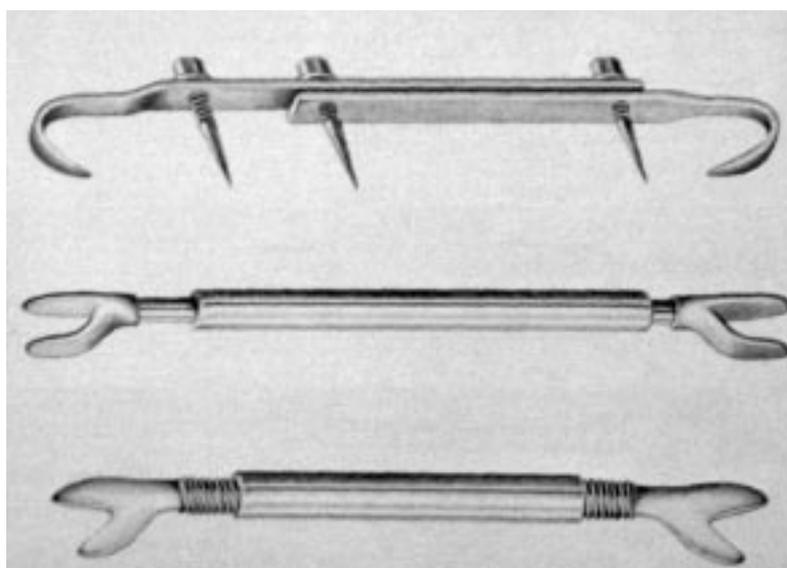


Fig. 2. Marino-Zucco instrumentarium

ry results in 1962 [10]. Initially, the author of the method proposed to correct scoliosis without spondylosis, with additional staged rod-assisted correction to be performed later. Complications like hook displacement, fractures of processes, rod breakage and spontaneous spondylosis led Harrington to agree with Dr J.Moe's advice to use instrumentation together with spondylosis. This decision was the beginning of modern spine surgery.

Harrington's method became very popular all over the world. It was used in the treatment of all spine diseases, spinal trauma and tumours, both from posterior and anterior approaches (in some modifications).

In Poland this method was applied for the first time in 1968 by Król in Poznań.

The Hospital Orthopaedic Factory in Poznań manufactured Harrington instrumentation from biological steel, thanks to which this method could be introduced to other Orthopaedic Departments in Poland. Wejssflog and his team from the Orthopaedic Department from Bytom began to use their own distractor in 1968, calling this method „metaloplasty” (Fig. 4).

Harrington instrumentation underwent many modifications in Poland. Wierusz and Baçal devised the BW2 set, which was very popular in Poland and between 1970 and 1990 was used in almost all spine surgery centres [5].

In 1983 Tylman and his team introduced a special tool for multi-stage correction in the treatment of infantile scoliosis.



Fig. 3. Harrington instrumentarium



Fig. 4. Wejssflog metaloplasty

However, the idea of using an anterior approach in the treatment of spine diseases was never abandoned. In 1960 Dwyer in Australia started to treat scoliosis with anterior segmental instrumentation [4]. Lumbar kyphotisation associated with this method prevented it from gaining wider popularity. Klaus Zielke modified Dwyer's technique in 1970 by introducing open vertebral screws and a semi-rigid compression-distraction rod (Fig. 6). Good results were achieved with this method and it became hugely popular all over the world (19). In Poland, however, spine surgery from an anterior approach did not find many followers in 1945-1990.

All methods used for operative treatment of the spine required external immobilisation, usually by

means of a cast, which was very uncomfortable for patients. The orthopaedic world was working to develop cast-free operative techniques.

In 1982 Eduardo Luque from Mexico published preliminary reports of a new sublaminar technique for stabilization of spine curvatures with wires and L-shaped smooth rods (Fig. 7). He would not use any external immobilization after surgery [11]. In Poland this method was first used in the treatment of infantile scoliosis by Zarzycki [20]. Further modifications of Harrington's methods allowing early patient mobilization after surgery without external casting were introduced by Drummond in 1982 (Wisconsin technique) and Bobeckho in 1983. These methods quickly became very popular in Poland and were intro-



Fig. 5. BW-2 kit



Fig. 6. Zielke instrumentarium

duced into clinical practice by Tokarowski, Golik, Urban and Zarzycki (Fig. 8).

The next turning point in spine surgery came in 1984 when Cotrel and Dubouset used implants for three-plane spinal correction (C-D instrumentation). The system of two rods with a set of open hooks and transpedicular screws revolutionized both reconstructive and emergency spine surgery (Fig. 9).

In our country the C-D method was used for the first time by Przybylski in 1985. After obtaining Cotrel's oral consent for the production of C-D instrumentation in Poland, Baçal started production at the University of Technology in Zielona Góra. Later, the production of spinal systems was also started by a newly-formed company called LfC.

The C-D instrumentation has had many modifications such as TSRH, Colorado, Miami-Moss, Polish DERO and many others (Fig. 10).

Actually, the number of spinal systems both for anterior and posterior approaches is rapidly increasing. These systems are being adapted for use in the correction of various spinal deformities. New solutions have revolutionized treatment of spinal deformations in myelomeningocele and lumbar scoliosis by the introduction of transpedicular screws and other items.

Contemporary spine surgery does not only mean the treatment of scoliosis, but deals with a wide range of spinal diseases including deformities, tumours and degenerative changes.

Since 1990 all these spinal conditions can be

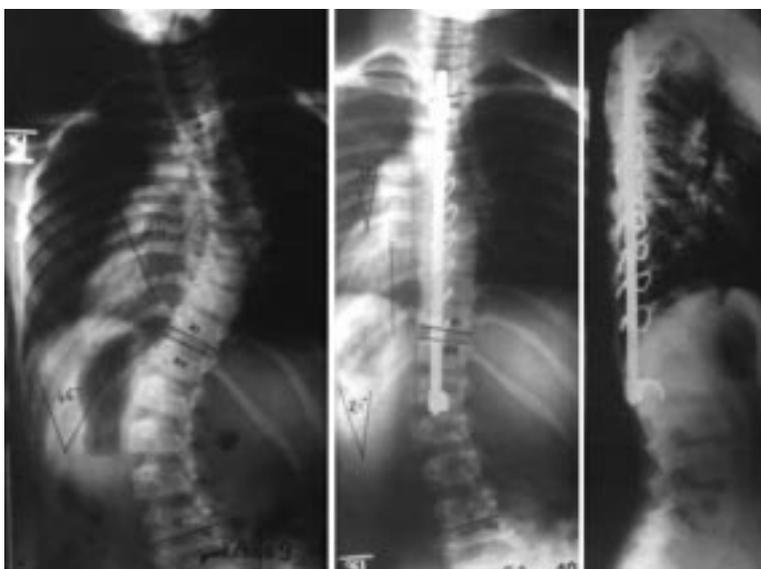


Fig. 7. Harrington-Luque instrumentarium



Ryc. 8. Technika Wisconsin

treated at Polish specialist centres according to modern methods without any delay in comparison with USA and Western Europe.

Among the large number of technical solutions, the most important goal of spinal implants was correction and good spondylodesis of the operated region of the vertebral column. However, spondylodesis always limited the function and mobility of the spine. That was the reason why, in the mid-1990's, spinal arthroplasty began to gain popularity, starting with artificial cervical and lumbar discs. Several years' follow-up has confirmed the positive effects of these elements. This year in our country, two pilot disc implantation procedures (lumbar and cervical) were carried out in Poznań and Cracow.

In the 75-year history of the Polish Society of Orthopaedics and Traumatology (PTOiTr) three congresses of Society were dedicated to spinal diseases.

- 1956 Warsaw 12th Congress of PTOiTr
 - topic I: „Management of scoliosis”
 - topic II: „Management of spinal fractures with plegia”
- 1970 Katowice 14th Congress of PTOiTr
 - topic I: „Management of idiopathic scoliosis”
 - topic II: „Management of femoral neck fractures”
- 1992 Gdansk 20th Congress of PTOiTr
 - topic I: „Management of scoliosis”
 - topic II: „Knee injures”.

The National Spondyliathric Section of the Polish Medical Society was established on 5 February, 1972. Prof. Gerwazy Świdorski was the first president of the



Fig. 9. Cotrel-Dubouset instrumentarium



Fig. 10. System DERO

Section. The Section cooperates very closely with the Polish Society of Orthopaedics and Traumatology.

A steady growth of new methods of diagnosis, treatment and surgery of vertebral column diseases and an increasing interest in these problems among orthopedists led to the establishment of the Spondyloorthopaedic Section of the Polish Society of Orthopaedics and Traumatology in 1981. Prof. Stefan Malawski from Otwock was elected the first president. The Section organizes „spine” conferences every second year, alternating with congresses of the Society.

I have dedicated the largest part of this historical outline to the people who participated in the development of spine surgery in Poland and in the world. In using bibliographic data I wanted to show how we followed world novelties, tendencies and preferences. I wanted to refresh our memories and bring back the achievements of all people who, through their hard work, built the basis of today's Polish spine surgery.

It seemed to me the most important matter in these Jubilee days.

REFERENCES

1. Albee F.: Transplantation of a portion of the tibia into the spine for Potts disease: A preliminary report. *JAMA* 1911, 57, str. 885-886.
2. Bobechko W.P.: Super Stability Fusion for Scoliosis Reconstruction. *Div.Orthop.Surg.* 1983.
3. Cotrel Y, Dubousset J.: Nouvelle Technique d'Osteosynthese Rachidienne Segmentaire par voie Posteriere. *Rev. Chir.Orthop.* 1984, 70, str. 489-491.
4. Dwyer A.F., Newton N.C., Sherwood A.A.: An anterior approach to scoliosis. A preliminary report. *Clin.Orthop.* 1969, 62, str. 169-202.
5. Drummond D.: Wisconsin segmental spinal instrumentation. *Orthop.Trans.* 1982, 6, str. 22-25.
6. Gruca A.: The pathogenesis of idiopathic scoliosis. *J.Bone Joint. Surg. (Am)* 1958, 40, str. 570-84
7. Gruca A.: *Revue de Chir. Ortop.*, 1956, 42, str. 916-920.
8. Gruca A.: Estratto XLI Congresso Societa Italiana di Ortopedia e Traumatologia. Bologna, 1956, str. 419-429.
9. Gruca A.: Rozwój ortopedii w Polsce w latach 1928-1958. *Chir. Narz. Ruchu Ortop. Pol.*, 1958, 23, str. 509 - 514.
10. Harrington P.: Treatment of scoliosis: Correction and internal fixation by spinal instrumentation. *J. Bone Joint. Surg (Am)* 1962, 44, str. 592-610.
11. Luque ER.: Segmental spinal instrumentation for correction of scoliosis. *Clin.Orthop.* 1982, 163, str. 192-209.
12. Przybylski J.: Technika C-D/Cotrel-Dubousset/ w operacyjnym leczeniu skolioz. *Chir. Narz. Ruchu Ortop.Pol.* 1992, LVII, supl.1, str. 35-39.
13. Raszeja F.: Polska Bibliografia ortopedyczna 1900 - 1930. *Chir. Narz. Ruchu Ortop. Pol.* 1932, 5, str. 531-567.
14. Royle ND.: The operative removal of an accessory vertebra. *Med. H. Aust.* 1928, 1, str. 467.
15. Rutkowski J.: Nawykowe skrzywienie kręgosłupa. *PPCH.* 1925. IV, str. 108.
16. Wierzejewski I.: Czy istnieje nawykowe boczne skrzywienie kręgosłupa? *Chir. Narz. Ruchu Ortop. Pol.* 1928, z. I.
17. Von Lackum H.L., DeForest-Smith A.: Removal of vertebral bodies in the treatment of scoliosis. *Surg.Gynecol. Obster.* 1933, 57, str. 250-256.
18. Zaremba J.: Uwagi krytyczne o operacji Albee'go w gruźlicy kręgosłupa. *Chir. Narz. Ruchu Ortop. Pol.* 1929, z. IV.
19. Zielke K, Stunkat R., Beaujean F.: Derotation and fusion. Anterior spinal instrumentation. *Orthop. Trans* 1978, 2, str. 270.
20. Zarzycki D.: Operacyjne leczenie skolioz wczesnodziecięcych. *Chir.Narz.Ruchu Ortop.Pol.* 1985, 50, str. 95-101.