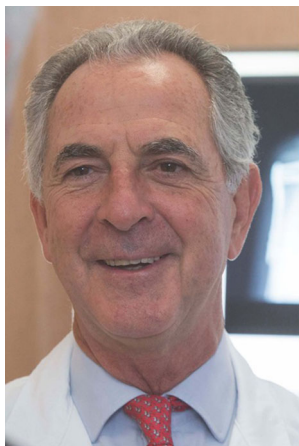




The history of Italian Orthopaedics

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Introduction

“The modern orthopaedic surgeon doesn’t only have to be a surgeon, not even just a mechanic. He has to be first of all a doctor in the widest sense of the word. He has to be a scientist, not a simple empirical therapist....I think we can affirm the theory that orthopaedics has to include not only deformities of the locomotor system, but all the injuries and surgical diseases of it.”

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This is what Alessandro Codivilla said on the 22nd of September 1906 Milan at the 3rd congress of the *Italian Orthopedics Society*.

Words that have remained imprinted in history that represent the “Magna Charta,” the definitive of independence of orthopaedics from mother surgery. In 1891, in Italy, an initial national surgeon’s association was already founded dedicated to the cure of bones and joints diseases. From that day on, Italian orthopaedics was becoming a real specialistic subject.

Alessandro Codivilla (1861–1912) can be considered the real architect of the refoundation of the *Italian Orthopedics Society*, but many are Italian authors who had already contributed in the past century, to the development of the modern orthopaedics, starting from Giovanni Battista Monteggia (1762–1815), who described the traumatic lesion named after him (“Monteggia lesion” also known as “Parry’s fracture”).

Riccardo Galeazzi (1866–1952) who named the “Galeazzi lesion” known as the lesion opposite to the Monteggia one, with the fracture of the radial diaphysis and distal radio-ulnar

joint, is also renowned for a namesake clinical sign in the diagnosis of the congenital hip dislocation.

Also, Agostino Paci (1845–1902) gave a big contribution to congenital hip dislocation, a surgeon in Pisa, often in opposition to the more famous Adolf Lorenz, a surgeon in Vienna both holder of the “Paci-Lorenz method.”

In this range, the personality in the Italian orthopaedics history probably best known is Vittorio Putti (1880–1940) who cannot be mentioned without Marino Ortolani (1904–1983), a paediatrician in Ferrara who was the first to describe the “Ortolani method” that today is known worldwide (in different languages, “signe du ressaut,” “click sign,” “schanapp-phenomen,” “sign of the jerk,” “signo de resalte”), systematically examined for in newborn babies as a premature and sure sign of a congenital hip dysplasia.

It was Putti himself, who with his diplomacy, turned out to be the most determined and convincing promoter of the institution, in 1929 in Paris, SICO (*Societ  Internazionale de Chirurgie Orthopedique*), which he proposed to transform into SICOT (...*et de Traumatologie*) on the occasion of the 3rd congress, celebrated in Italy between Bologna and Rome in 1936, a historical event that in Italy would have had only one repetition, over a period of 80 years, in September 2016, when the congress was taken to Rome again, for the 37th edition, organized and attended by Francesco Falez.

The only Italian president of the Societ  has been Calogero Casuccio (1909–2003), one of Putti’s students, from 1975 until 1978.

In the following years, there have been many Italian contributions to the development of modern orthopaedics in all the possible areas of application.

Giorgio Monticelli (1915–1994), with his studies on the rachis, on scoliosis, and on the limb’s extension.

Giovanni De Bastiani (1921–1988), who designed an external uniaxial fixator (Orthofix).

Oscar Scaglietti (1906–1993) and Italo Federico Goidanich both directors of the Cancer Center of Rizzoli who in 1962 founded the “Skeletal-Muscle Bank,” and Mario Campanacci (1932–1999), known because of his foundation in 1987 of EMSOS (*European Society of Muscular and Skeletal Oncology*), also known for discovering new anatomic and clinical entities (such as *the hemorrhagic osteosarcoma* and multiple non-ossifying fibromas of the long bones, also known as the *Campanacci syndrome*) and for publishing “Bone and Soft Tissue Tumors,” a fundamental text for all of those who work within the subject.

In a more modern age, many other personalities contributed to the international development of the well of knowledge: Francesco Pipino, Lorenzo Spotorno, Francesco Santori, Giancarlo Puddu, Pier Paolo Mariani, and Mario Mercuri are

just of some of the names who gave prestige to the Italian orthopaedics.

Many authors took example from well-known predecessors and today nurture scientific research and innovative spirit and continue conducting an intense clinical and academic activity. Thanks to the constant affinity with SICOT this has allowed the birth of this special number of its official Journal “International Orthopaedics” that testifies the intense zeal that still livens up Italian orthopaedics.

General orthopaedics

In the past years, the scientific community demonstrated a certain interest towards the biology and the possible healing of muscle and skeletal injuries with preservative and/or biological treatments. In these years, the role of the adipose autologous tissue is currently highly studied, from both a clinical [1] and a histological point of view to demonstrate its possible regenerative characteristics [2].

In osteochondral lesions, bone marrow concentrate in the preclinical animal model seems also to give results [3].

Hip

Femoroacetabular impingement (FAI) is a well-known disease responsible for coxarthrosis and is the object of numerous studies that could increase its notoriety. Randelli [4] explained the role of the os acetabuli in association with the FAI.

When hip disease caused a serious articular deformity, prosthetic replacement is the only solution.

Although hip arthroplasty is a greatly successful procedure, we constantly work on improving the results. A lot of attention is being given to operative preparation in order to reduce costs on the blood management [5].

Also, the use of an anterior muscle-sparing approach has caused great attention dealing with its different that seem to give excellent outcomes [6], as a result short stems have been more frequently used with the introduction of a short polished collarless tapered cemented stem.

Santori [7] reported a survival of 100% with revision of the stem for aseptic loosening as the endpoint.

However, short stems also have their failures causing a new spectrum of proximal femoral deficit different to the much better known from the standard classification systems.

Casella and Falez [8] for this reason have suggested a new system of classification of the proximal femur bone deficit to try to clarify and propose indications during revision of short-stem failures.

The key point in total hip arthroplasty is to understand how to decrease the failures, increasing, therefore, the survival of the implant.

Support in this sense can be obtained from a DEXA scan that after 20 years of follow-up, was demonstrated to be a useful marker for hip implant longevity in the cementless stem [9].

The situation becomes complicated in the presence of serious hip deformities such as the Crowe type IV of hip dysplasia where it is necessary to perform a shortening femoral osteotomy to obtain good long-term results [10].

Despite knowledge of tricks, failures still exist and there are many reports which consider their characteristics and the results of revision treatments.

Metallosis causes local adverse reactions including lesions of different clinical relevance from small asymptomatic soft tissue lesions to dramatic osteolysis, necrosis, effusion, and growing masses which can cause secondary pathological effects [11].

The failure of resurfacing hip arthroplasty with ASR implants has been analyzed with blood tests. Chrome and cobalt level determination with the MARS MRI hip study and the results of the inspections of 100 patients who had ALVAL lesions have been studied [12].

Also, periprosthetic hip infections are correlated with metal-on-metal (MoM) coupling, particularly in stemmed implants and with higher risks, probably due to metal debris consequent to taperosis. Despite the preliminary results, stemmed MoM THAs should be used with care and diabetic patients should be warned about increased septic risks [13].

In two-stage revisions, a cementless implant with an anti-bacterial hydrogel coating shows better control of infection than an implant without [14].

When the failure of hip arthroplasty causes big acetabular defects, custom-made components promise good solutions with low complication rate [15]. Also, 3D-printed custom-made prostheses represent a promising reconstructive technique, both in musculoskeletal oncology and in challenging revision [16].

Knee

In the last 15 years, 812,639 primary total knee arthroplasties (TKAs) were performed in Italy on patients over 40. The total number of surgeries increased by 262% with an average annual growth rate of 6.6%. Adopting the best fitting projection method, an increase of 45% in incidence rate is expected for 2050 [17].

For this reason, we need to constantly improve our knowledge and our surgical technique.

Correct positioning of components [18] and stable ligament balancing during ROM [19] represent the key of success in TKA.

Spine

Spinal diseases historically show great complexities and equally complex surgical solutions.

Mucopolysaccharidosis involve the skeletal system and particularly the spine, with developing kyphosis at the thoracolumbar junction that can cause neurological symptoms, and dens hypoplasia with associated atlantoaxial subluxation that can cause myelopathy. Surgical treatment is effective in severe evolving cases both at the cervical and at the thoraco-lumbar level; the main difficulties arose from the unavailability of dedicated instrumentation in very young patients, as even the smallest devices available are often too big [20].

Also, the treatment of spinal fractures shows many hidden dangers. The important thing is to know the right indications to choose the best solution, both in thoraco-lumbar fractures [21] and in sacral fractures, because the sacrum is a mechanical nucleus working as the base for the spinal column, as well as the keystone of the pelvic ring [22].

Trauma

The femoral neck fractures in old-aged patients are probably the greatest challenge, both for the surgical difficulties of the treatment of a fracture due to osteoporosis and for the weakness of a delicate patient. An integrated, multidisciplinary model for the treatment of hip fragility fractures was effective in reducing time to surgery and mortality, increasing the level autonomy and mobility status and promoting adherence to re-fracture therapy [23].

Femoral shaft fractures with third fragments have a high non-union rate (14%). Size (cutoff, 40 mm) and displacement (cutoff, 12 mm) of the fragment are the main features on fracture healing [24].

The choice between nailing or plating in fractures of the distal tibia is actually controversial.

Vaianti [25] reported that clinical and radiological results appear similar. The rate of infections and wound complications was higher in locking plates and malunion and anterior knee pain were more frequent in intramedullary nails.

However, in Gustillo IIIB tibial fractures, with critical bone defects, the management is different and remains a challenge in trauma surgery. Ronga [26] suggests the use of the Masquelet technique in acute bone defects to successfully manage these severe lesions.

Vicenti [27] analyzed the healing evolution of femoral shaft fractures studying the dimension of callus and efficacy of dynamization. For the author, nail dynamization should be performed between three and six months after trauma and the optimal callus-to-diaphysis ratio should be comprised between 1.47 and 1.19 at the time of dynamization.

Sports medicine

Ferretti analyzed the “unhappy triad” and described the association with the anterolateral complex. In all patients with ACL, MCL, and meniscal tear, they have found at surgical exploration a lesion of the anterolateral complex. For the author, the “unhappy triad” of the knee is actually a “tetrad” involving not just the ACL, MCL, and medial/lateral meniscus but also the anterolateral complex [28].

Upper limb

Gumina [29] evaluated the effects of rotator cuff tear (RCT) and its severity on shoulder proprioception. He concluded that RCT provokes an alteration of shoulder proprioception, evaluated as the loss of joint position sense, and that the impairment is related to tear severity.

De Carli [30] compared results of two different open surgical techniques (open capsuloplasty and Bristow-Latarjet procedure) at a mid-to-long-term follow-up (6 years) in patients with recurrent traumatic anterior shoulder dislocations. The author found no statistical difference in terms of recurrent dislocation rates, clinical shoulder stability tests, and scoring scales. The rate of patients returning to sport was similar after both techniques. Open capsuloplasty and Bristow-Latarjet procedure are both validated surgical techniques for the treatment of recurrent shoulder anterior instability. However, patients with open capsuloplasty reported a significantly lower recovery of external rotation than patients operated on via the Latarjet procedure.

Lower limb

Varus deformity of the ankle is considered a contraindication to total ankle replacement (TAR). Usulli [31] evaluated the results of the group of patients with standard deformity versus the results of the “varus group” (pre-operative deformity of more than 10 degrees) after cementless mobile-bearing TAR. Complications were similar between the two groups without statistically significant difference ($p > 0.001$). The author concluded that severe varus malalignment should not be considered a contraindication to a mobile-bearing TAR, but should be performed only by experienced surgeons.

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