



Dr. Saverio Affatato

Kick-off meeting

Barcelona, 3-5 March 2014

Laboratorio Tecnologia Medica
Istituto Ortopedico Rizzoli
Bologna, Italy

The Rizzoli Orthopaedic Institute - overview

In 1896 the Rizzoli Institute was opened as a special hospital for orthopaedics and traumatology.

In 1981 was recognized as National Hospital and Research Institute for Orthopaedics

2014: The Rizzoli Institute is the largest Research and Healthcare center on orthopaedics in Italy

The Rizzoli Orthopaedic Institute - overview



Rizzoli
Orthopaedic
Institute

The diagram shows a hierarchical structure. At the top is a box labeled 'Rizzoli Orthopaedic Institute'. A vertical line descends from this box and splits into two horizontal lines. These lines lead to two separate boxes below: 'Rizzoli Orthopaedic Hospital' on the left and 'Codivilla-Putti Research Center' on the right. The background of the slide is a photograph of a grand, ornate interior space with a large arched mural and classical architectural details.

Rizzoli
Orthopaedic
Hospital

Codivilla-Putti
Research
Center

The Hospital: the number

- **150 000 PATIENTS EXAMINED PER YEAR**
- **OVER 20 000 ORTHOPAEDIC OPERATIONS
PER YEAR**
- **327 BEDS**

The Research center: the number

- ✓ **15 LABORATORIES**
- ✓ **OVER 300 PEOPLE EMPLOYED:**
DOCTORS, BIOLOGISTS,
ENGINEERS, TECHNICIANS

THE RESEARCH CENTRE

Immunologia

Biochimica

Laboratorio di Tecnologia Medica

Director Dr. Aldo Toni

Fisiopatologia
Impianti ortopedici

Biomeccanica

Tecnologia
Medica

The Medical Technology Laboratory



Running research tasks related to WIMB

- Long term effects of cementless arthroplasty
- Development of new tools for earlier implant failure clinical detection
- In Vitro evaluation of functional performances of new prostheses
- Biomaterials and soft tissue characterization

Running research tasks related to WIMB (2):

- FEM prediction of functional performances of new prostheses
- Bone remodelling around total hip replacements
- Wear assessment of different materials such as cer-on-cer, met-on-met, and cer/met-on-pol bearings

Experimental facilities: Testing machines



Hydraulic uniaxial testing machine Mod. 8502, Instron, with a load capacity of 100 kN equipped with data acquisition boards (up to 4 channels)



Hydraulic uniaxial testing machine Mod. MiniBionix 858, MTS, with a load capacity of 15 kN, equipped with data acquisition boards (up to 16 channels, 5 kHz)



Electric uniaxial testing machine Mod. V1000, Vitrodyne with LOAD CAPACITY OF 100 N



Hydraulic uniaxial testing machine Mod. FPF 20, Italsigma, with a load capacity of 20 kN



Hydraulic axial-torsional testing machine Mod. MiniBionix 858, MTS, with a load capacity of 100 Nm and 15 kN equipped with data acquisition board (up to 16 channels, 5 kHz)



The SHORE WESTERN hip wear simulator is used to investigate wear in prosthetic hip joint. The wear tests were performed following the recommendations defined in international standard.

Experimental facilities: Hip and Knee wear simulation



Experimental facilities: X-ray microtomography (microCT) applied to bone investigation



MicroCT system Skyscan 1072 installed at LTM-IOR:
Left, microCT system. Right, the external PC

Computational Biomechanics:

Structural and kinematic
subject-specific model
for the study of stress levels
in the bone

Prediction of risk of fracture in
osteoporotic subjects

Analysis of the functional outcome
for bone-prosthesis systems



R.I.P.O. : a peculiar activity

- The [Register of Orthopaedic Prosthetic Implants \(R.I.P.O\)](#) was initiated at the Rizzoli Orthopaedic Institutes in 1990.
- It allows the epidemiological evaluation and the post-marketing monitoring of orthopaedic medical devices.



The Research center

