# ABSTRACT

Cervicarthrosic pathology is a frequent reason for neurological and rhumatologic consultation. Osteoarthritis on the level of the cervical vertebrae is the pathological entity most widespread which can in certain cases be relatively early starting from the age of 20; besides old patients. The therapeutic possibilities are multiple, variable according to state or gravity of osteoarthritis, its evolutionary degree, its functional repercussion and the respective effectiveness of the various symptomatic treatments. Finally, the advanced degenerative attacks (serious even invalidating) of cervical column requires the recourse to surgical means.

Our contribution aims at improving the therapy of this pathology by proposing a new material, in fact a silicone elastomer. This material is subjected tribological to effects, generally observed within a functional vertebral unit (FVU) specific of the head inflection movements.

The first part of this study, is to bring ahead the tribological effects materializing wear at the level of the cervical vertebrae, which is a approach few researchers of the medical field have invest gated so for.

Our step consists in reproducing the movements of the head (effects of the inflection before and back of the head) using a testing ground constituting a vertebral unit functional C5/C6, in which we interpose material in order to analyze its behavior taking into consideration tribological effect generated by these mobilities by applying a load, at various speed and a scale of displacements maintained constant. The material is subjected to wear experiments.

The method of extreme experiment planning of the enabled us to influent mathematical models generating this tribological behavior on the one hand, and on the other hand the determination of the service life of this material undergoing this wear.

Whatever is the nature of the external mechanical loading, by contact or by inertia, the mechanical response of the implied anatomical elements results in deformation phenomena of and scoliotic constraints. The goal of this study is modelling by finite element method making it possible to explore the crack mechanisms occurring at the time of loading of the main movements of sagittal, side and axial inflection on the disc intervertebral junction between C5 and C6. The results indicate that the maximum stress obtained on the disc is about 1.559 MPa.

The carried work out was profitable insofar as the results found are encouraging, in particular, for the lifespan of material proposed.