As long as one goes into medicine with those ideas you would never be disappointed. As far as neurosurgeons are concerned, there's only one thing to do and that is to train. I wouldn't suggest one to go into a speciality that is in its peak, but instead to think about something that hasn't evolved yet. When I started doing functional neurosurgery very few people did it. I was teased for being a 'woodpecker' neurosurgeon, operating through small holes but it was a field still evolving then. When you're one of the early ones to do something, you get the joy of doing something new. The flip side to this is that working in Chitrakoot also gives me immense pleasure. People who don't have much come to me for diagnosis and treatment which I am so happy to do. These patients go home with medicines, come back after 8 days, happy. They're just glad they were given the time and attention they needed. That's another way to go about it. It will always be up to you to choose your path.

Comic strip by Atharva Rane, II MBBS, M.I.M.E.R. Medical College

ENGINEERING MEDICINE

by Pamposh Bazaz, III M.B.B.S., R.I.M.S. Raichur

The emergence of lifesaving biomedical implant insertion has today become a very common and often lifesaving procedure. The sheer volume of orthopaedic implants, hip replacement, knee replacement surgeries performed on a daily basis as well as the now widespread use of cosmetic implants has given rise to a newfound problem, implant-associated infections. In the quest to create anti-infective biomaterials, the focus tends to be quite one dimensional, preparing biomaterials with antibacterial properties and enhancing their properties by excess use of antibacterial agents. This extensive use has resulted in individuals with implants having compromised host responses and unpredictable effectiveness in vivo.

Thus, a more innovative means to resolve this issue has been deemed necessary. Two 4th year engineering students, Vishwas Mehta and Harshil Parekh, from Vellore Institute of Technology, Vellore, have come up with an ingenious solution: Using Reverse Micro Electrical Discharge Machining (R-MEDM) as a tool to fabricate arrayed structures for surface texturing, their project hopes to develop biomedical implants with enhanced bactericidal properties without trading off the patient's immune system. The study also explores the feasibility of the technology using Response Surface Methodology (RSM) and the influence of control variables such as material removal rate and surface roughness in response to changing current, voltage and pulse duration. This is analysed using ANOVA.

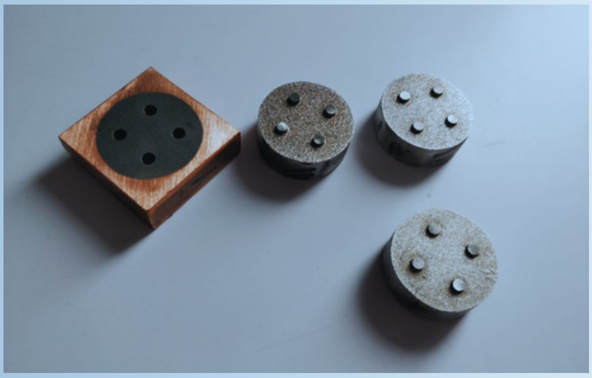
The project endeavours to investigate whether the fabrication of the microstructure surface produces significant antibacterial properties and hence its viability in biomedical implants. Biomedical implants have an increased risk of bacterial infection post-surgery possibly due to a polysaccharide matrix known as biofilm that attaches to the post-surgery surface of the implant and protects bacteria from pharmacological therapy.

Studies postulate that the walls of the bacteria disfigure while stretching as they interact with the textured surfaces. This stretching occurs in the particular areas between the structures and is sufficient enough to rupture the cell.

Nano and micro-structures impact the surface topography and roughness, drastically increasing contact adhesion area, hence ameliorating the bactericidal properties in comparison to flat surfaces. Parameters affecting the pharmacological bactericidal efficiency such as the height, radius and spacing between the micropillars are taken into consideration while producing the desired textured surface.

Earlier this year, Vishwas and Harshil were successful in implementing R-MEDM to alter the surface texture via the fabrication of micro-pillars on stainless steel 304. Control variables such as material removal rate (MRR), electrode wear ratio (EWR) and surface roughness (SR) showed maximum response to high current and voltage, the current being the most significant factor to generate a response.

Unfortunately, at present surface roughness is observed to deteriorate at very high values of voltage and current and doesn't meet the standard required to be of application in biomedical implants. Yet it also provides substantial evidence to conduct further research in the application of R-MEDM to develop advanced biomedical implants without compromising the health of patients thus ensuring that individuals with lifesaving implants don't succumb to diseases that are a result of the said implants in the future.



R-MEDM altered surface.