RESILIENCE OF SILICONE BREAST IMPLANTS – NEW INSIGHTS BY MAPPING THE MECHANICAL PORPERTIES OF IMPLANT

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ABSTRACT

The knowledge on rupture of gel-filled silicone breast implants is an open question since the first implantation in 1962. We present recent progress which was made by a mapping of the mechanical properties of the shell material together with a statistical failure analysis by means of a Weibull fit. Reference implants and intact as well as ruptured explants are tested after several years in vivo by tensile tests. Up to 110 dumbbell-shaped specimens per implant are measured allowing a detailed mapping of the mechanical properties of the silicone shell. Therefore, it is possible to illustrate obtained results by mapping the measured values of the implants in form of a contour plot revealing novel insights. The contour plots clearly reveal that the mechanical behavior (e.g. stress at break) varies significantly over the shell [1].

Additionally, a novel map is proposed which clearly shows separated clusters for the different manufacturers and product categories indicating a large variety of shell resilience [1].

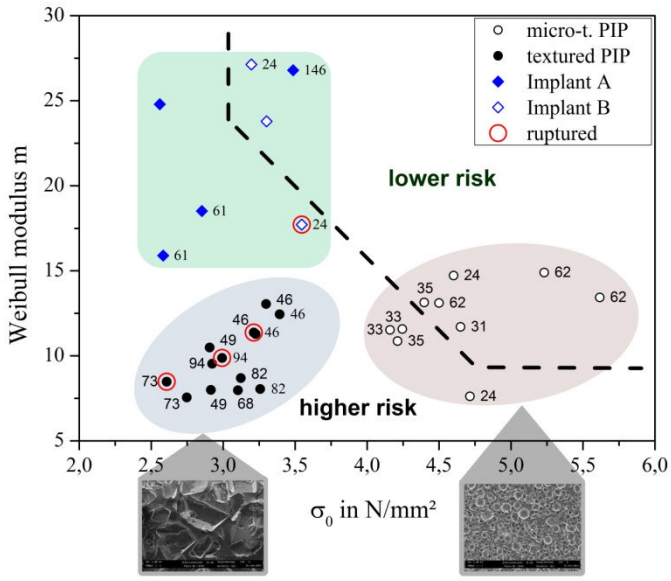

Fig. 1: Novel map, utilizing determined Weibull modulus m and characteristic strength σ_0 as appropriate coordinates to benchmark implants manufactured by PIP, Benchmark A and B. The dashed line indicates a first guess separating good and poor quality implants. Numbers on dots are the duration of implantation, respectively.

References

[1]Schubert, D. W.; Kaschta, J.; Horch, R. E.; Walter, B. L.; Daenicke, J. *Polym Int* **2013**, *DOI: 10.1002/pi.4619*.