**Comparison of the gamma radiation and electron beam effect on medical Ultra-high molecular weight polyethylene is polyolefin**

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Ultra-high molecular weight polyethylene is polyolefin polymer and was classified as cross liked polymer commonly us in artificial joints. However, part of their chains undergo oxidation by radiation in the present of O2 atmosphere leading to accelerate the degradation process and reduce the lifespan when implanted in the body. The goal of this study is to investigate gamma ray and E-beam, irradiation effects on the UHMWP materials. The experimental design of the studies is take into account irradiation conditions, namely total dose and its uniformity, dose rate, temperature, and irradiation environment (normal or oxygen-free). In addition, evaluation of the irradiated samples involves the functionality studies, physical and chemical analysis; color change, mechanical properties, ageing studies and radical stability of irradiated plastic. The results showed that the damage effect of gamma irradiation on UHMWP is higher if compared with that of EB. The amount of radical formed by radiation using electron is less than that formed by irradiation using Gamma rays. Moreover, the structure change on UHMWP treated with gamma and EB at the same doses was investigated to find out that temperature, dose rate, and total irradiation dose as well as O2atmosphere has a great effect on the oxidation process of UHMWP and consequentially on its structure. Although the main interaction with matter is basically the same for gamma and high-energy electrons, some differences between the two modes remain.