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Finalist

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Spinal fusion is a process used by many different doctors and surgeons to treat spinal abnormalities and diseases. Spinal fusion has been tested throughout the years and advanced in order to ensure its safety and functionality. Specifically, spinal fusion can be used to treat scoliosis which is "an abnormal lateral curvature of the spine that affects 2 to 3 percent of the population" (American Association of Neurological Surgeons). This treatment has been tested over the years on rats in order to advance the spinal fusions. The help of animal models and new scientific breakthroughs helped to develop spinal fusions in order to allow them to become effective on humans.

Biomedical research on animals is essential in testing the safety of a treatment before it is used on a human with possibly detrimental effects. Rats were the animal of study for the spinal fusion to be experimented on. Researchers assigned rats to different categories of either no treatment, or a specific type of spinal fusions in order to test the relative security of the treatment and its effects 8 weeks post operation. All rats responded well to treatment, none of which having any significant calluses or inflammatory cells, ensuring the safety of the treatment. The rats all survived the treatment with no complications which can help indicate that the treatment would also work well on humans, an essential conclusion that could not have been achieved without biomedical research and testing on animals.

Currently, there is rapidly increasing research and testing being done on spinal fusion implants. Titanium is the most commonly implanted medical material due to its high biocompatibility. A clinical investigation was done by Dr. Girasole which tracked 82 patients who underwent transformational lumbar interbody fusions and documented their pain after surgery and the fusion rates. The titan endoskeleton implant used by this doctor, at 6 months post operation had a 93.2% fusion rate. At 12 months post operation the rate had increased to 97.4%. Not only were the fusion rates outstanding, but the pain dramatically decreased over time following surgery on a scale of 0 to 10, with 10 being the worst pain imaginable. Before surgery patients rated their pain at an 8, while at 6 months after surgery, decreasing to only a 4, and 12 and 24 months after surgery, down to about a 3.5. This showed the overwhelming success of the spinal transfusion and the use of titanium as the implanted material. There is still continuing research being done on how to improve the effectiveness and quality of the fusions.

This topic personally affects me due to my case of scoliosis which required spinal fusion in order to correct. I underwent spinal fusion December of 2012, and still currently have no complications or pernicious effects. Without the biomedical experimentations performed on rats, I would not have been able to receive such an effective procedure with no outstanding side effects that would be detrimental to my health. Spinal fusions are still changing and being revised in order to ensure patients the best results possible. This procedure is under constant scrutiny from doctors and patients due to different proteins used in the fusion that could be

harmful to those who undergo the procedure. The goal of biomedical research is to constantly improve the safety and success of treatments which has been essential in spinal fusions.

Ultimately, spinal fusions are an ever developing treatment that will not stop advancing. Majority of the reason spinal fusions have advanced to the quality they are at now is because of the biomedical testing done on animals. Throughout this testing and research, doctors have been able to drastically increase the amount of spinal fusions done, and change the life of millions of people worldwide.

Works Cited

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