2016 PSBR High School Essay Contest
Grand Essayist

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My uncle has had a heart for running since his earliest years. Waking early each morning, he would throw on a pair of sneakers and take to his routine running path, going and going until all bodily parts began to ache. Avid and adventurous, he has taken part in events such as the Boston and Athens Marathons. Taking such into account, it seems inevitable that he was to come across certain aches and pains throughout the course of his life. His hip, specifically, paid the price. Suffering from severe discomfort, he began to call his entire lifestyle into question. With the help of biomedical research, however, along with the aid of various mice and canines, he was able to undergo hip replacement surgery, keeping his love for running untarnished to this very day.

The earliest attempts at hip replacement surgery can be traced back to the early seventeenth century, using materials such as silver plates, glass, wax, and muscle tissue ("Bio Total Hip Technology"). Advances in this field of biomedical technology, however, did not really take off until the early 1960s. The first successful attempt at this type of surgery is commonly attributed to Orthopedic Surgeon GK McKee. In 1960, McKee designed his famous hip replacement utilizing a metal stem to be inserted into the hollow center of the femur, as well as an acetabular component. Both parts of this design were inserted into the hip using cement ("The Early Years…"). While certainly a major step forward in the realm of hip replacement, McKee's design proved unsatisfactory after a period of time. Then, in 1962, Sir John Charnley began investigation of the puzzling process of developing an artificial hip. He designed his "Low Friction Arthroplasty" using a steel femoral component and a polyethylene acetabulum replacement. The design was lubricated with synovial fluid. Charnley's intention was to reduce friction with surrounding joints ("Bio Total Hip Technology"). Cherished as the father of the modern hip replacement, Charnley made leaps and bounds in this field of biomedicine. While certain obstacles still remained, Charnley's efforts are still greatly hailed as of today.

Throughout the course of this strenuous process, researchers utilized animals as a source of experimentation in order to better understand the effects of this arthroplasty. Beginning with mice, scientists eventually tested a wide range of animals, including dogs, goats, and sheep ("Result Filters"). Through utilization of these various species, researchers were able to determine the effectiveness of the hip replacement designs on models having a similar jointly structure to that of humans. While some may oppose the idea of animal research, it seems that such is necessary in better understanding the field of biomedicine. Animal research has not only benefitted humans, but the scientific advances made through this investigation are of great benefit to animal species, as well. Hip replacement is a prime example, as this type of treatment can be conducted on people and animals alike. The opportunities that are posed through animal research extend far beyond just joint replacement. Treatments and advances have been made in nearly all aspects of health through this type of practice. As a result, it seems that this research is extremely crucial for the betterment of scientific understanding and progress.

The animal research conducted throughout the course of hip replacement history has allowed for the creation of a modern hip repair. This design includes a metal femoral stem connected to a ceramic ball replacing the femoral head. A metal socket is then put into place, and a plastic liner rests between the ball and socket to ensure minimum friction ("Total Hip Replacement…").

This very design enabled my uncle to maintain a tight grasp on his active lifestyle. While he does need to keep a certain level of caution, he is no longer withheld from outdoor activity by hip pain. As the father of three busy girls, he is certainly always on the move. Due to his new hip replacement, however, being on the move is no longer a dreadful chore. Certainly, my uncle would never have suspected when receiving a new hip that a mouse was to thank for the surgical success. I suppose I will have to tell him to be more forgiving when a small white rodent scurries across his floor. After all, it was that very rodent, along with the incredible advances of biomedical research, that designed his new hip.

Works Cited

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