

**DEVELOPING AN ADAPTOR FOR THE NASAL CANNULA FOR FACIAL PLASTIC
SUGERY**

**ANALYZING THE DIFFERENCE IN THE PERCEPTION OF OVER-THE-COUNTER
DRUGS AND ANESTHESIA DRUGS USING ACTOR NETWORK THEORY**

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SOCIOTECHNICAL SYNTHESIS

Medical avoidance is a phenomenon where a person willingly delays or completely avoids obtaining health care at the cost of their own well-being because of factors such as cost or fear. The technical project aims to create an adaptor for the nasal cannula that would allow it to be placed in the mouth instead of the nose during facial plastic surgery to utilize monitored anesthetic care (MAC) more often than general anesthesia. The science, technology and society (STS) research provides a framework through which to analyze the perception of anesthesia drugs in comparison to over-the-counter drugs, in order to explain the negative perception of anesthesia drugs in the public. The two projects are tightly coupled, as both involve methods of reducing medical avoidance in the population. The technical project aims to reduce the physical factor of cost in the operating room, while the STS report aims to identify what causes the mental factor of fear of anesthesia in the public.

The technical report outlines the development of an adaptor that connects to the dual nasal cannula to allow for placement into the mouth. When using MAC, patients are only partially sedated so oxygen must be supplied and carbon dioxide needs to be monitored and this is currently performed via nasal cannula. During often in facial plastic surgery cases, the nasal cannula obstructs the access of surgeons to the face and the current solution of placing the nasal cannula into the patient's mouth is unstable and remains partially obstructive. Through the creation of this adaptor, more surgeries can be done under MAC which is cheaper, faster and safer than general anesthesia. This device was modeled using the design software Autodesk Fusion 360 and was 3D-printed out of Thermal Polyethene (TPU).

Many prototypes of the adaptor were successfully printed, and testing on its mechanical and functional properties were done. The data from those tests proved that the adaptor allows the

nasal cannula to perform its function even under the stressful conditions that it may be faced with in the mouth. Due to time constraints, no clinical testing of the device was done and no professional fabrication was completed. However, approval from the surgeon team we were working with leads us to believe the device will be a big help for them in the operating room.

The goal of the STS reach paper was to identify ways to lower medical avoidance by combating the mental aspect of the problem, focusing on fear in particular. The STS research will attempt to identify factors that can lower the level of fear in the public's perception of anesthesia by looking at the differences in the current perception of over-the-counter drug usage and anesthetic drugs in surgery, revealing where the perceptions of these technologies originate. These differences will be compared by the creation of two Actor Network Theory models, which is based off of the Actor Network Theory (ANT) framework, originally developed in the early 1980s by Michel Callon, Bruno Latour and John Law. The framework was developed by looking at research papers, organizational information, and regulations in order to create the connections between the technology and the actants.

Over-the-counter drugs and anesthesia drugs share many of the same actants in an ANT model, but over-the-counter drugs have a much better perception among the general public because of the differences in how the interactions work. Using the three major actants of the government, doctors, and daily life, ANT models were created for the technologies. From the models, the impact that anesthesia drugs have on daily life was significantly worse than over-the-counter drugs. While daily life only had positive connections in the over-the-counter ANT model, in the anesthesia drugs model, daily life had only negative or non-connections. While no solution was found, identifying the area that needs to be focused on was the goal of this paper in order to work towards lowering medical avoidance caused by the mental factor of fear.

Lowering medical avoidance is important to improving the overall health of the nation and would help instill good practices if there happened to be another emergency like the COVID-19 pandemic. While there are physical factors like cost that can cause a person to practice medical avoidance, there are mental factors like fear as well. Tackling the problem of medical avoidance from both a physical and mental perspective will create the best chance at reducing medical avoidance overall in the general public.

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PROSPECTUS

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