

**FACTORS INFLUENCING
DISTRIBUTION OF PROSTHETIC
DEVICES IN IRAN:
AN ECONOMIC ANALYSIS**

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Background

- An estimated 177,622 Iranians have suffered an injury resulting in amputation.
- Prosthetic devices in Iran are often scarce, and amputees become a dependent population.
- Prosthetic distribution is effected by landmines, economic sanctions, unequal wealth, and inefficient supplies and physicians.
- Three-dimensional printing can be a solution, coupled with combating etiologic causes of amputation.

Deficits Caused by Amputation

- Economic growth is stunted due to lack of participation and interaction within society.
- Amputation interferes with amputees economic, social, and psychological life— which is further compacted by lack of available prosthetic devices.
- Familial structures are disrupted.
- Younger generations are becoming more disabled.
- Amputees have a heightened probability for early death.

Landmine Epidemic: Collateral Damage from War

- Approximately 16 million landmines (including explosive ordinances) are placed within 4,000 hectares of western provinces.
- Landmines cause approximately 800 deaths and 1,200 injuries per month.
- Populations in rural areas are at the highest risk for landmine related death and injury.
- Amputees and landmine victims share common demographic characteristics.



Economic Sanctions Preventing Resource Accessibility

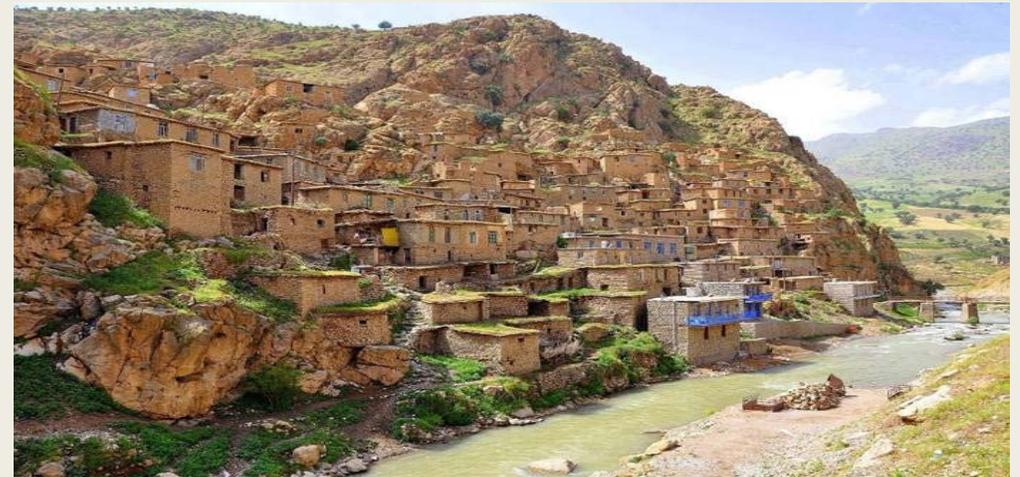
- United States (and their economic allies) and Iran are not allowed to trade with each other.
- Sanctions have changed in response to relationships with government officials.
- There is hope that as the two countries work towards common goals, economic tensions will be reduced, and sanctions lifted.

Unequal Distributions in Wealth

- There is an imbalance of resources between urbanized and rural regions.
- The government responded by implementing an unsuccessful program that focused on developing primary health care services to help alleviate the differences in medical resources.
- These factors create a strain on public health systems due to the continuous imbalance of medical resources.



http://iranluxurytravel.com/wp-content/uploads/2014/07/tehran_cityA-view-of-Tehran-with-Alborz-mountains-on-the-back.jpg



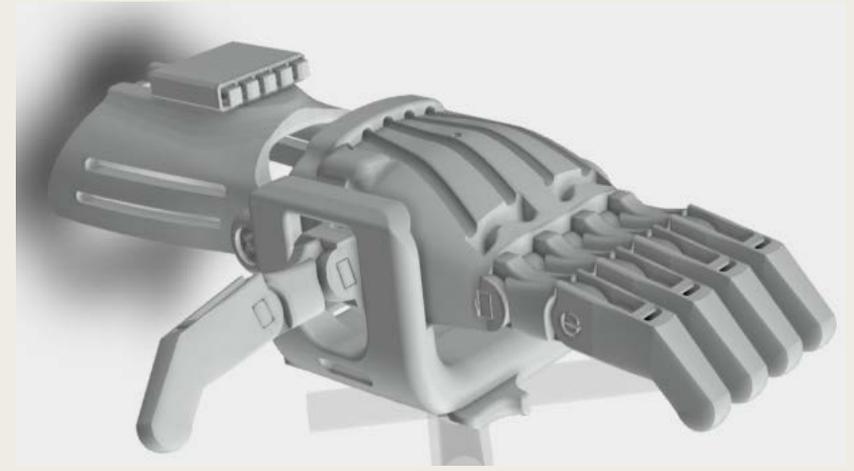
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Inefficient Materials and Physicians in Conjunction with Low Finances

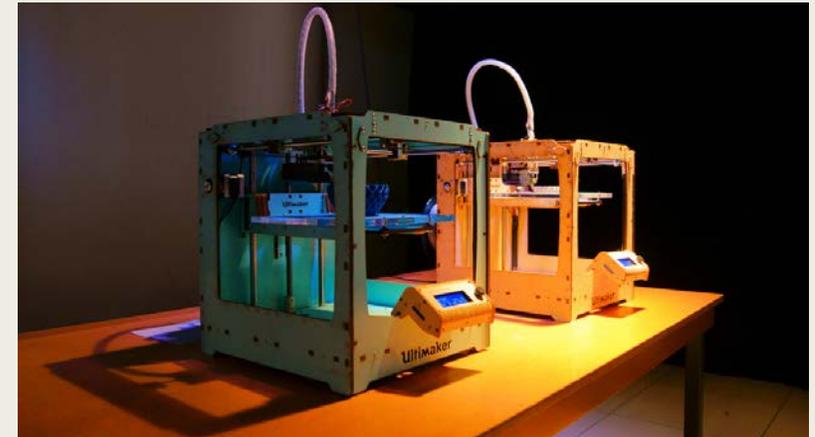
- Common complaints regarding prosthetics include high costs, lack of properly trained physicians, and lack of material and accessibility.
- Prosthetics that are produced are generally not made correctly or sustainably.
- In first world countries, prosthetics can range from \$14,000-\$62,000 and are covered by insurance—in third world countries costs are inflated and health insurance is hard to obtain.
- Locating properly trained physicians to the area could result in funding for that area and properly produced devices.

Three-Dimensional Printers Providing Low-Cost Prosthetics at High Production Rates

- The three main components of prosthetic limbs are the socket, leg portion, and foot or socket, arm portion, and hand.
- Computer-aided design and computer-aided manufacturing has been used to successfully create prosthetics through rapid prototyping, at a low cost.
 - *Upper-extremity prosthetics, which are considerably more expensive than lower-extremity prosthetics, can be produced with 3D printers for \$200.*
- Sponsoring a program or organization to provide 3D printers would create job opportunities and affordable medical devices, as well as relieving stress on the medical systems in place.



<https://impactdesignhub.org/wp-content/uploads/2016/09/screenshot-620x325.png>



<http://dealingwithdifferent.com/wp-content/uploads/2014/10/3d-printing.jpg>

Combating Etiology of Amputations

- The leading cause of amputation is trauma.
- Most amputation victims have injury to the upper extremities, and are young males in the industrial workforce.
- Preventative measures against different types of trauma would lessen the amount of amputations experienced in the country.
- Better access to education would also allow individuals to be qualified for a wider variety of jobs.

Conclusion

- Many causes of the amputations in Iran are preventable or are a result of economic challenges that could be mitigated.
- The potential for better communications between the United States and Iran could present many potential solutions for eliminating amputation.
- Despite financial challenges in Iran, technological advancements by the United States (and access to such information) and the avoidance of amputation etiology could eliminate prosthetic accessibility issues.

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