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TEISĖS FAKULTETAS

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SHOULD A BIONIC PROSTHESIS BE CONSIDERED AS A PART OF A HUMAN BODY?

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ABSTRACT

Domantas Klimas, "Should A bionic prosthesis be Considered as a Part of a Human Body?".

The reason for this Master's Thesis is to find the answer to whether a bionic prosthesis should be considered as a part of a human body, or not. A bionic prosthesis is a prosthesis that is connected to the brain of its owner and is controlled be the brain. From a legal point of view, a bionic prosthesis is a thing and real rights applies to it. It isn't clear if a current legal regulation of bionic prostheses is the best option and if it is fair for the owners of bionic prostheses, because current legal regulation doesn't approach specific issues that bionic prostheses creates.

Considering that a bionic prosthesis functions similar to a part of a human body, a solution for a proper legal regulation of bionic prostheses could be to accept these prosthetics as parts of a human body. If this would be a case, same legal regulation would apply for bionic prostheses and natural parts of a human body. The author of the Master's Thesis creates the research, which allows to compare a bionic prosthesis to a part of a human body. The results of the research shows that a bionic prosthesis doesn't have any significant differences from a part of a human body. Then a conclusion, if a bionic prosthesis should be considered as a part of a human body, is made. In the conclusion it is stated that a bionic prosthesis should be considered as a part of a human body, since it is similar to a part of a human body and unnecessary restrictions for bionic prostheses shouldn't be made.

SANTRAUKA

Domantas Klimas, „Ar bioninis protezas turėtų būti laikomas žmogaus kūno dalimi?“.

Šio Magistrinio baigiamojo darbo tikslas yra rasti atsakymą į klausimą, ar bioninis protezas turėtų būti laikomas žmogaus kūno dalimi, ar, kaip ir iki šiol, turėtų būti laikomas daiktu. Bioninis protezas yra protezas, pirmą kartą pritaikytas naudojimui 1993 metais. Bioninis protezas nuo įprastų protezų skiriasi tuom, jog jis yra neuro-sensoriais prijungiamas prie jo savininko smegenų ir yra valdomas jo naudotojo smegenų signalais. Tai leidžia bioninio proceso savininkui šį protezą naudot be papildomų pastangų ir efektyviai. Bioninio proceso valdymo principas yra paremtas tuom, jog asmeniui, pavyzdžiui, nelaimingo atsitikimo metu netekus rankos, jo smegenys nesuvokia, jog asmuo nebeturi rankos ir toliau siunčia neuro-signalus neegzistuojančiai rankai, tarsi jis vis dar egzistuotų. Amputuotoje vietoje prijungus bioninį protezą ir neuro-sensorius, į neegzistuojančią ranką siunčiami smegenų atsiųsti signalai transformuojami į tam tikrą formatą, kurį bioninis protezas gali nuskaityti. Tokiu būdu, smegenų signalais perduodamos komandos tiesiogiai valdo bioninį protezą. Bioninis protezas funkcionuoja panašiai, kaip ir natūrali žmogaus kūno dalis, tačiau yra ir skirtumų. Pagrindinis skirtumas – bioninis protezas yra pagamintas technologijų pagalba – tai nėra biologinė struktūra, o žmogaus sukurtas gaminys, tuo tarpu natūrali žmogaus kūno dalis susiformuoja žmogaus susikūrimo procese.

Teisiškai, bioninis protezas yra daiktas, atitinkantis Lietuvos Respublikos Civilinio kodekso 4.1 straipsnyje esantį daiko apibrėžimą, ir bioniniui protezui yra taikomos daiktinės teisės, nurodytos Lietuvos Respublikos Civilinio kodekso 4 knygos 2 dalyje. Toks teisinis bioninių protezų reguliavimas yra taikomas bendrosios ir kontinentinės teisės šalyse (valstybių, kuriose naudojama kitokia teisinė sistema, pavyzdžiai šiame darbe nėra analizuojami). Svarbu pažymėti, jog šiame darbe yra analizuojami skirtingų valstybių bioninių protezų teisinio reguliavimo pavyzdžiai ir nagrinėjami skirtingų valstybių įstatymai ir bylos, kadangi siekiama priimti objektyvias ir įvairių teisinių reguliavimų pavyzdžiais paremtas išvadas. Teisinė problema yra tokia, jog nėra aišku, ar dabartinis bioninių protezų teisinis reguliavimas yra geriausias galimas teisinio reguliavimo variantas ir ar toks teisinis reguliavimas yra teisingas ir sąžiningas bioninių protezų savininkų atžvilgiu, kadangi dabartinis protezinių prietaisų teisinis reguliavimas neįvertina specifinių problemų, kurias sukelia tik bioniniai protezai.

Atsižvelgiant į tai, kad bioninis protezas funkcionuoja panašiai kaip ir natūrali žmogaus kūno dalis, išeitis randant teisingiausią bioninių protezų teisinį reguliavimą galėtų būti pripažįstant bioninius protezus žmogaus kūno dalimis. Tokiu atveju, vienodas teisinis reguliavimas būtų taikomas tiek bioniniams protezams, tiek natūralioms žmogaus kūno dalims. Siekiant šio tikslo, yra

svarbu išsiaiškinti, koks yra žmogaus kūno ir žmogaus kūno dalių teisinis reguliavimas. Darbe yra analizuojami kitų autorių, rašančių šia tema, moksliniai darbai. Taip pat, yra analizuojamos bylos, kuriose keliamas klausimas, ar žmogaus kūnas ir žmogaus kūno dalys nuosabybės teise tam tikrais atvejais gali priklausyti asmeniui, ar ne. Tuomet šio darbo autorius atlieka tyrimą, kuriuo siekiama palyginti bioninio protezo ir natūralios žmogaus kūno dalies požymius. Tyrimui atlikti naudojami trys tyrimo metodai: bylų analizė, ekspertų apklausa ir lyginamasis. Tyrime naudojami tyrimo metodai yra kokybiniai tyrimo metodai. Bylų analizėje aprašomos dvi bylos, kuriose nagrinėjamas klausimas, ar protezinis prietaisas gali būti laikomas žmogaus kūno dalimi, ar ne. Iš bylų analyzės matyti, kad dėl šio klausimo nėra sutariama. Ekspertų apklausoje ekspertams, turintiems žinių ir patirties bioninių protezų ir jų teisinio reguliavimo srityje, užduodami penki klausimai, kuriais prašoma atsakyti į klausimus, iškilusius šio darbo teorinėje dalyje. Iš ekspertų apklausos matyti, kad ekspertai neturi bendros nuomonės, ar bioniniai protezai turėtų būti laikomi žmogaus kūno dalimis. Lyginamuoju metodu lyginama natūrali žmogaus kūno dalis, transplantuota žmogaus kūno dalis ir bioninis protezas. Palyginimo rezultatų analizė parodo, kad skirtumai tarp natūralios žmogaus kūno dalies, transplantuotos žmogaus kūno dalies ir bioninio protezo nėra žymus. Svarbiausias skirtumas – bioninis protezas yra pagamintas technologijų pagalba ir nėra biologinė struktūra. Svarbu pažymėti, jog tai, kad bioninis protezas nėra natūralus žmogaus kūnui, nėra svarbi sąlyga neleisti bioninio protezo laikyti žmogaus kūno dalimi – kaip paaiškėjo analizuojant transplantuotų kūno dalių teisinį reguliavimą, transplantuota kūno dalis yra laikoma recipiento kūno dalimi ir jai taikomas toks pats teisinis reguliavimas, kaip ir natūraliai žmogaus kūno daliai.

Tyrimo rezultatai parodo, jog bioninis protezas neturi žymių skirtumų nuo natūralios žmogaus kūno dalies, kurie neleistų bioninio protezo laikyti žmogaus kūno dalimi. Galiausiai, remiantis šio darbo teorine dalimi ir atliktu tyrimu, priimta išvada, jog bioninis protezas turėtų būti laikomas žmogaus kūno dalimi. Tokia išvada yra priimta remiantis tuom, jog, kaip paaiškėjo atliktus tyrimą ir jo analizę, bioninis protezas yra panašus į natūralią žmogaus kūno dalį savo veikimo principais ir galimybėmis. Taigi, bioninius protezus naudojančių žmonių atžvilgiu nėra teisinga apriboti jų teises, susijusias su žmogaus kūnu. Tikėtina, jog kiekvienas asmuo nori gyventi laimingai ir patogiai, tuo tarpu dabartinis bioninių protezų teisinis reguliavimas to neužtikrina. Taigi, Magistrinio darbo autorius pasiūlo bioninių protezų teisinį reguliavimą, kuriuo bioniniai protezai būtų laikomi žmogaus kūno dalimis. Bioniniai protezai sąlyginai greitai turėtų būti tokie pat geri kaip ir natūralios žmogaus kūno dalys – tokia pozicija yra paremta išanalizavus teoriją ir ekspertų nuomones – todėl svarbių priežasčių, kodėl bioniniai protezai neturėtų būti laikomi žmogaus kūno dalimis, nėra. Taip pat Magistrinio darbo autorius pabrėžia, jog specifinės bioninių protezų savybės, kurių neturi kitos technologijos, turėtų būti detaliai apibrėžtos bioniams protezams skirtų įstatymų.

INTRODUCTION

Originality of the subject. The first successful kidney transplantation was made in 1954.[1] It was not only the first successful kidney transplantation but also a first successful transplantation of a part of a human body. This medical achievement led to many great things. Today medics are transplanting many different parts of a human body, including internal parts of a human body (hearts, lungs, kidneys, etc.), as well as external parts of a human body (limbs, faces).[2] However, it isn't always a natural part of a human body that is being attached to a person. It might be a mechanical device.

A prosthesis is "an artificial device to replace or augment a missing or impaired part of the body"[3]. People have been using prostheses for ages.[4] Since the beginning of prostheses till a few decades ago, prostheses only allowed their owners to do simple tasks, for example, pushing a chair. Such tasks don't require for a prosthesis to be able to execute complex movements. The experts in the field of bionics ("a science of how humans and animals perform certain tasks and solve certain problems, and of the application of the findings to the design of electronic devices and mechanical parts"[5]) has created a new kind of prosthesis – a bionic one[6]. The first a bionic prosthesis was given to a person in 1993.[7] Bionic prostheses allows their owners to accomplish a lot more tasks than regular prostheses does. People that owns bionic prostheses don't have to put any unnecessary effort in using them – a bionic prosthesis is being controlled by its owner's brain. People that has bionic arms can actually grab and hold things without being afraid to drop them, tie a tie, etc. It isn't far from a utopia where people, who are disabled due to not having a part of a body, are no longer disabled if they own bionic prostheses.

Therefrom, a question arises: should a bionic prosthesis be considered as a part of a human body? This is a very important question, because, as everything in the world, a use of bionic prostheses has to be regulated by the rules of law in the most accurate way possible. Currently, bionic prostheses falls under the laws of regular prostheses or robotics and it isn't clear whether such legal regulation is the best possible option for regulating bionic prostheses. If a bionic prosthesis is very similar to a part of a human body in a way it works; if a bionic prosthesis is able

[1] Alvin Powell, *A Transplant Makes History* (2011 09 22); <http://news.harvard.edu/gazette/story/2011/09/a-transplant-makes-history> [accessed on 2017 01 03].
[2] <https://transplantliving.org/community/patient-resources/frequently-asked-questions> [accessed on 2017 03 13].
[3] <https://www.merriam-webster.com/dictionary/prosthesis> [accessed on 2017 01 03].
[4] Kim M. Norton, *A Brief History of Prosthetics* (2007); <http://www.amputee-coalition.org/resources/a-brief-history-of-prosthetics> [accessed on 2017 01 04].
[5] <http://www.dictionary.com/browse/bionics> [accessed on 2017 01 03].
[6] Katie Collins, *Bionic Hand Can Feed Physical Sensations Directly to the Brain* (2015 09 14); <http://www.wired.co.uk/article/darpa-creates-feeling-prosthetic-arm> [accessed on 2017 01 04].
[7] Rob Dimery, *1993: First Bionic Arm* (2015 08 18); <http://www.guinnessworldrecords.com/news/60at60/2015/8/1993-first-bionic-arm-392887> [accessed on 2017 01 03].

to help its owner to accomplish the same tasks as a part of a human body does; and the main difference between a bionic prosthesis and a part of a human body is that a bionic prosthesis is made using technologies and isn't natural to its owner – perhaps a bionic prosthesis should be considered as a part of a human body.

If a bionic prosthesis would be considered as a part of a human body, this would be a huge step into the future of law, as well as a great change in the lives of people that owns bionic prostheses. Since a bionic prosthesis is a thing and real rights applies to it, in a scenario where a bionic prosthesis would get damaged by some party in any way, using Lithuanian criminal law as an example, such crime would be treated as a damage to a property. In this case, the party who had damaged a bionic prosthesis, would have to pay prosthesis' cost, its repairs, etc. Withal, is such legal regulation, where a bionic prosthesis is considered as a thing, fair for the owners of bionic prostheses? When a person losses a part of his body, he's not able to enjoy his life anymore in a way he was able prior to the loss. It could be argued that the same could apply if a person losses a bionic prosthesis – he's also not able to enjoy his life anymore in a way he was able prior to the loss. A need for a prosthesis is a specific need, not as one needs a property. A person needs a prosthesis so he would be able to live a normal life, enjoy it and do everything he was able to do before losing a part of his body. Since current legal regulation that regulates bionic prostheses doesn't address such issues, there is a need of an analysis, of whether a bionic prosthesis is a thing, or should it be considered as a part of a human body.

Relevance of the subject. As of the relevance of this topic, there is no clear answer to a question whether a bionic prosthesis should be considered as a part of a human body. As it will be stated later, a conflict of opinions arises: the law, as it is right now, considers a bionic prosthesis as a thing, while some of the opinion leaders of this topic are saying that a bionic prosthesis should be considered as a part of a human body.

Scientific problem. It isn't clear, whether a bionic prosthesis should be considered as a part of a human body, or as a thing.

Subject of the research. Legal status of a bionic prosthesis.

Goal of the research. To set whether a bionic prosthesis could be considered as a part of a human body, by comparing the features of a bionic prosthesis and a part of a human body; to give suggestions for bionic prostheses legal regulation.

Methods of the research. The case analysis, the interview of the experts, the comparative analysis.

Hypothesis. If a bionic prosthesis does everything equally, or better, to a respective part of a human body, it should to be considered as a part of a human body.

Tasks:

1. To summarize the definition of a bionic prosthesis and its legal regulation.
2. To summarize the definition of a part of a human body and its legal regulation.
3. To create the research methodology which would allow to compare the features of a bionic prosthesis and a part of a human body; to perform the research.
4. To summarize the data of the research; to give suggestions for a legal regulation of bionic prostheses.

Structure of the Master's Thesis. The Master's Thesis consists of a summary in English language, a summary in Lithuanian language, an introduction, 2 theoretical parts, the research methodology and the research, a discussion, conclusions, recommendations, references and an annex.

1. SUMMARY OF THE DEFINITION OF A BIONIC PROSTHESIS AND ITS LEGAL REGULATION

In Subsection 1.1 it is stated why bionic prostheses are important to be discussed about. Then it is explained how a bionic prosthesis is connected to a human body and what are the main principles of its functioning. In Subsection 1.2 it is explained what the legal status of bionic prostheses is and how they are legally regulated. Further, medical insurance policies and tort law in the USA regarding bionic prostheses are analyzed. Then, a legal regulation of bionic prostheses in the EU is analyzed.

1.1. Definition of a bionic prosthesis

The first bionic prosthetic was attached to a person in 1993. It didn't have a lot of functions and its owner had to wear a cap with micro-sensors in order to control the prosthesis.[8] Since then a lot has changed in the area of bionic prostheses. Today bionic prostheses are a lot cheaper than they were a few years ago.[9] This change is mostly based on the revolution of 3D printing technologies.[10] A company "Open Bionics" is in development of making a bionic hand that would cost $1,200, while other bionic arms costs between $35,000 and $120,000.[11] Instead of wearing a cap with micro-sensors, new bionic prostheses are connected to a human body through sensors that are placed on owner's body next to prosthesis.[12]

An importance of bionic prostheses over regular prostheses is explicit. While regular prostheses allows their owners to accomplish only simple tasks, bionic prostheses allows a lot more. A company "Bebionic" offers a bionic arm that has many features, such as 14 selectable grip patterns, speed control, different wrist options, etc.[13] Furthermore, bionic prostheses that are able to feel – has feedback systems – are being made.[14] It is important to state that bionic prostheses are made not only in a form of limbs, but also in forms of other parts of a human body.[15] However, for the reason of simplicity, most of the Master's Thesis is written in regards to bionic prostheses as limbs.

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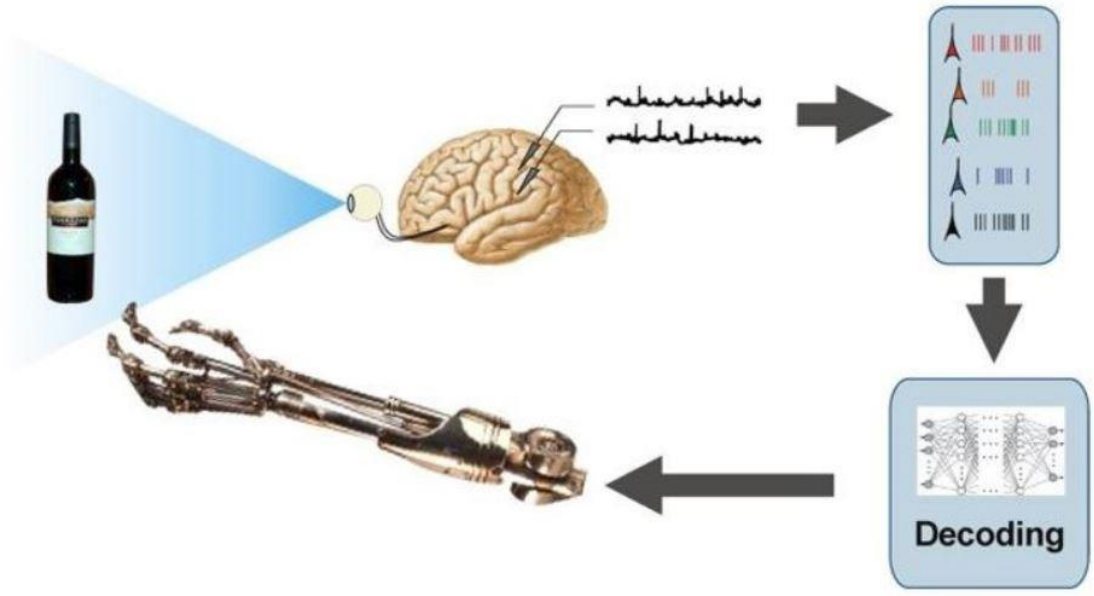
[8] See note 7.
[9] Caspar de Vries, *Open Bionics: 3D Printed Prosthetic Limbs* (2017 01 25); <https://ultimaker.com/en/stories/36096-open-bionics-3d-printed-prosthetic-limbs> [accessed on 2017 04 13].
[10] <https://3dprinting.com/what-is-3d-printing> [accessed on 2017 04 14].
[11] See note 9.
[12] Id.
[13] <http://bebionic.com/the_hand/features> [accessed on 2017 01 25].
[14] Dustin J. Tyler, *Creating a Prosthetic Hand That Can Feel* (2016 04 28); <http://spectrum.ieee.org/biomedical/bionics/creating-a-prosthetic-hand-that-can-feel> [accessed on 2017 05 01].
[15] <http://www.allaboutvision.com/conditions/bionic-eyes.htm> [accessed on 2017 03 01].

From a legal point of view, a matter of bionic prostheses being considered as things, brings dilemmas. One of them – should an originality of bionic prostheses, as they are made using technologies and aren't natural to their owners, be a boundary for bionic prostheses being considered as parts of a human body? Another issue - for the people that uses bionic prostheses they are much more than things - these people's quality of life depends on prostheses much more than on other things.

As the Master's Thesis covers only a possibility of bionic prostheses being considered as parts of a human body, due to the lack of material and cases regarding bionic prostheses, regular prostheses will also be analyzed. Since bionic prostheses are legally regulated by the same laws as regular prostheses, use of the material and cases regarding regular prostheses is considered to be accurate.

Now it will be explained how bionic prostheses works, using a situation where person's arm had been amputated. After the amputation of an arm, the brain is still analyzing the surroundings as if the person would still have his arm. This means that even if the arm is lost, this doesn't affect the brain. In regards to this condition of the brain, it is possible to create bionic prostheses controlled by the brain. Hence, as it is shown in Image 1, there are many processes happening in the brain while reaching an object. This includes the brain evaluating how far the object is; creating a plan on how the brain, using person's body, will reach the object; lastly, using person's body to reach the object.[16]

Image No. 1[17]



[16] Carlos Pedreira, Juan Martinez and Rodrigo Quian Quiroga, *Neural Prostheses: Linking Brain Signals to Prosthetic Devices* (2009).
[17] Id.

The evidence collected from monkey neurophysiology research shows that posterior parietal cortex, which is a part of the brain that "receives input from a collection of sensory areas [...] "[18], is the main part of the brain that controls the movement of person's body.[19]

Bionic prostheses detects and process the brain activity (neural signals) form the posterior parietal cortex.[20] This means that the most important task in creating a well-functioning a bionic prosthesis is to gather correct data from the posterior parietal cortex. The next step in the process of moving a bionic prosthesis is to analyze gathered information through the specific algorithms – to decode the information.[21] This makes it possible to distinguish neural signals one from another. When it is clear, what are the exact neural signals used for, this information is being put into another algorithm, which analyzes new data and remakes it into basic information that a bionic prosthesis is able to read.[22]

Current decoding systems aren't faultless and there is always a possibility of an error in decoding neural signals, which is serious legal problem. Bionic prostheses manufacturers haven't found a way to describe how the brain creates neural signals that are being sent to move person's body. The decoders that are being used for bionic prostheses are based on an artificial intelligence mechanisms that works by interpreting every specific event; there is a possibility that such mechanisms could interpret the brain signals not as it should and wrong outcome is conceivable.[23]

In the event of the movement that caused an accident, it is necessary to distinguish whether the movement was made because of a bionic prosthesis' malfunctioning or the owner of a bionic prosthesis actually wanted to perform such movement. As to this possible scenario, post analysis of neural signals that have been used to perform the movement should be made.[24] In Andrea Bertolini's, who is a famous academic in the field of law of bionic prostheses, opinion, bionic prostheses should have "black box" type of systems that could record and store the information that a bionic prosthesis gathers from the brain of its owner.[25] Even though neural signals could possibly be recorded and stored, it would only help if an accident could be traced back to a single moment; there would be a need to settle that an accident was caused by one single movement - in reality it wouldn't be easy to reach such settlement.[26]

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[18] <http://www.neuroscientificallychallenged.com/blog/know-your-brain-posterior-parietal-cortex> [accessed on 2017 02 15].
[19] See note 16.
[20] Id.
[21] Id.
[22] Id.
[23] Andrea Bertolini, "Robotic Prostheses as Products Enhancing the Rights of People with Disabilities. Reconsidering the Structure of Liability Rules", *International Review of Law, Computers and Technology* (2015, vol. 29), p. 120.
[24] Id.
[25] Id.
[26] Id.

Besides decoding systems dilemma, bionic prostheses also has other different issues:

1. The brain signals that controls a bionic prosthesis are transformed into electrical activity, which goes through electrodes that are located one the socket (a spot where the limb was amputated) and are connected to functioning muscles. This process doesn't always give the best results, since the signals are influenced by external factors, as sweat or heavy loads. Such factors could possibly create unwanted consequences and a bionic prosthesis wouldn't work properly.[27]
2. A bionic prosthesis has a motor that physically moves it. The motor is switched on when the neural signal goes through all the processes of decoding, which takes a long time. This leads to lag between command of the brain and response of a bionic prosthesis.[28]
3. Most of bionic hands can only conduct one or two actions at the same time; this limits number of possible actions.[29]

As every technology, bionic prostheses are evolving. It is only a matter of time, when bionic prostheses will be equal or even better than parts of a human body. In respect to the short amount of time from the beginning of bionic prostheses manufacturing till now, it is safe to state that the issues mentioned above will be fixed. The algorithms that were mentioned earlier are relatively slow, however, their speed could be improved by applying different physiological signals, as ultrasound or brain-computer interface; more dexterous bionic hands that are faster and are able to do more different types of movements are being refined.[30]

1.2. Legal Regulation of Bionic Prostheses

To explain what a legal status of bionic prostheses is, Lithuanian law will be used as an example. It is assumed that similar legal regulation applies in most of the countries that are based on the Civil Law or Common Law legal systems.

A right to a thing is a real right, which is defined by the Article 4.20 of the Civil Code of Lithuania: "Real right is an absolute right that manifests itself by the right of the owner to implement the right of possessing, using, disposing or by some of these rights"[31]. It is a well-known fact (there is no need for a substantiation) that a prosthesis can be a subject of commercial contract; it can be possessed, used, sold or disposed by its owner in any other legally allowed way. As it is stated in the Article 4.1 of the Civil Code of Lithuania, "Things are objects of the material world

[27] A joint workshop hosted by the Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering and the Royal Society, *Human Enhancement and the Future of Work* (2012), p. 26.
[28] Id.
[29] Id.
[30] Id, p. 27.
[31] LR Civil Code (2000 07 18, No. VIII-1864), Art. 4.20.

obtained from nature or manufactured"[32]. Since a bionic prosthesis can be a subject of commercial contract; it can be possessed, used, sold or disposed by its owner in any other legally allowed way, it is considered as a thing and the Article 4.20 of the Civil Code of Lithuania applies to it.

In consideration of a bionic prosthesis being a thing, it is necessary to review how bionic prostheses are legally regulated in the world, since one of the tasks of the Master's Thesis is to give suggestions for a legal regulation of bionic prostheses. First, it will be explained how bionic prostheses are seen in the United States of America (further – the USA) as subjects of medical insurance and tort law. Therefrom, an example will be given of how an American lawyer Jon D. Lichtenstein, who is a co-chair of the Cyborg Law subcommittee of the New York City Bar Association Science and Law Committee, imagines an ideal bionic prostheses legal regulation, based on tort law. As tort law is more applicable to the countries that uses the Common Law system, there is a need to analyze how prostheses are legally regulated in the Civil Law system. For that reason, it will be explained how bionic prostheses are legally regulated in the European Union (further – the EU) and what issues this legal regulations has.

In the USA, most of Workers' Compensation statuses grants a recovery if the damage that an employee suffered was identical to bodily injury. Hence, if an accident happens at work and an employee gets his prosthesis damaged, he wouldn't get any kind of compensation for his recovery, despite the fact that the damage to prosthesis led to a temporary disability.[33] Even if some of these statutes recognizes damage to prosthesis as an injury, an employee couldn't claim a disability due to the damaged prosthesis. Section 13 of the New York Workers' Compensation law states: "Damage to or loss of a prosthetic device shall be deemed an injury except that no disability benefits shall be payable with respect to such injury under section fifteen of this article."[34]

The other important problem, especially in the USA, is that amputees have to deal with limited medical insurance coverage, if they are in Government managed medical insurance program.[35] Many of medical insurance plans covers all necessary medical procedures, however, when talking about prostheses, they are often limited to an annual or lifetime caps.[36] This means that an amputee, which is in Government managed medical insurance program, could get only one prosthesis for free in his lifetime. This is still a problem, although, the situation is changing. In 2015 an executive director of the New York's Health Insurance Exchange Donna Frescatore released a

[32] Id, Art. 4.1.
[33] Jon D. Lichtenstein, "Rights of Cyborgs: Is Damage to Prosthetic a Personal Injury?", *New York Law Journal* (2015 03 25).
[34] Id.
[35] *General information about insurance*; <http://www.hangerclinic.com/new-patient/ampower/Documents/General_Information_about_Insurance_for_Those_with_Limb_Loss.pdf> [accessed on 2017 05 09].
[36] See note 33.

regulation eliminating a restriction that limited amputees to have one prosthetic device per limb per lifetime.[37]

Jon D. Lichtenstein argues that medical insurance regulations, which doesn't allow to compensate or limits a compensation to damaged prosthesis for the only reason that prosthesis is made using technologies and isn't a natural to its owner, couldn't be justified:

> *"A lawyer with such a case could make a forceful argument that the law needs expansion. The judge wouldn't have to await legislative action. The distinction between damages for personal injury and property exists as a matter of judge-made tort law."*[38]

This speculation could be true in the countries of the Common Law, considering cases that will be analyzed later. In one of the cases, a part of a human body was considered not to be a property, while in the other case, a part of a human body was considered to be a property. While both of these cases analyzes the same subject, judges resolved these cases differently.

Tort law has a tendency to expand a recognition of damages over the time, so a possible solution for expanding a definition of an injury, including prostheses in it, could be a right case and an unprejudiced judge. If this expanded definition of an injury would come to force, there would be a need for an exclusion between different kinds of prostheses usages - to set rules for when a prosthesis is personal to its owner and when it is a thing.[39] An argument could be made that it isn't possible to set rules for when a prosthesis is personal to its owner and when it is a thing, since the law has no description for what a human body is (it will be explained in Section 2). Therefrom, if there is a legal dilemma for when a human body is personal to its owner and when it is a thing, the same would apply for prostheses.

Jon D. Lichtenstein thinks that a prosthesis will always be considered as a form of property and asks "whether a prosthetic or implant can morph into something more, something personal to us".[40] An example of some states in the USA is given, where courts have accepted a reputation to be person's property, so the reputation could be a subject of commercial contract.[41] If people are given rights to use something personal to them as a thing and real rights applies to it, a legal regulation, which would consider prostheses to be parts of a human body, should be possible to be made.

Jon D. Lichtenstein suggests that a solution for this dilemma could be an analysis of whether damage to a prosthesis caused its owner an injury: if the damage was made to the owner of

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[37] Peter W. Thomas, *New York's One-Limb-Per-Lifetime Restriction Attacked with Collaborative Effort* (2015); <http://opedge.com/Articles/ViewArticle/2015-07_04> [accessed on 2017 03 05].
[38] See note 33.
[39] Id.
[40] Id.
[41] Id.

a prosthesis through the prosthesis itself, such damage would be recognized as a damage to the owner and the prosthesis would be a legally recognized part of owner's body.[42] If this legal regulation would come to force, the main focus in determining whether a person was injured or his prosthesis was damaged, would be based on actual damage, not on the origin of a part of a human body. It would be necessary to institute that a prosthesis, which was damaged, is crucial to its owner so the owner could function as a normal human being - "a device that restores vision would qualify, but a device that allowed someone with normal vision to have telescopic vision wouldn't".[43]

An opposite opinion would be shared by transhumanists. As philosopher and futurist Max More describes:

> *"Transhumanism is a class of philosophies of life that seek the continuation and acceleration of the evolution of intelligent life beyond its currently human form and human limitations by means of science and technology, guided by life-promoting principles and values".*[44]

Transhumanists wouldn't agree with a legal regulation that would have a mandatory clause for instituting that a damaged prosthesis is crucial to its owner. Transhumanists would want to get a reward for any kind of ability they have lost, not only for standard - the law, as it is right now, rewards a person for everything he has lost.[45] One could argue that the main principal of legal regulation, suggested by Jon D. Lichtenstein, isn't awarding a person for his damaged prosthesis, but for person's injury. The main goal of such legal regulation would be to fix the problem that causes a person to be disabled. If damage to a prosthesis doesn't affect person's body in a form of disability, then such damage is recognized as damage to a thing, since its owner can still function as a normal human being.

It is important to highlight that if there would be a requirement, in case of damaged prosthesis, to prove that without a prosthesis its owner can't function as a normal human being, in some cases such condition would be difficult to prove.[46] In a scenario, where a person owns several prostheses and one of those prostheses gets damaged, this person could put another one on his body without any severities; he would have difficulties proving an injury, because it might be that he didn't experienced any. From perspective of a person, who owns one prosthesis, and who has experienced the same damage as a person who owns multiple prostheses, it would be easier to prove

[42] See note 33.
[43] Id.
[44] Max More (1990); <http://humanityplus.org/philosophy/transhumanist-faq> [accessed on 2017 03 23].
[45] See note 33.
[46] Id.

an injury. This would be not only a damage to a thing, but also it would create many issues for this person – he wouldn't be able to enjoy his life without his prosthesis.[47] In this legal regulation, such condition would easily qualify as an injury.

Legal regulation, suggested by Jon D. Lichtenstein, divides people that owns prostheses into two categories, based on a possibility of an injury. If a person owns one prosthesis and his prosthesis gets damaged, whereof this person becomes disabled, his prosthesis would be considered as a part of his body, because the consequences would be the same as if this person would lose a part of his body. If a person owns several prostheses and one of these prostheses gets damage, whereof this person becomes disabled, his prostheses wouldn't be considered as parts of his body, because he would be able to put another prosthesis on his body and the consequences of disability would only be felt for a short amount of time. The main difference between a prosthesis as something personal to a person and a prosthesis as a thing would be person's particular situation. An origin of a part of a human body would no longer be important. It is important to state that such legal regulation wouldn't be very different from the current law. "A disabled surgeon's personal injury case is worth many times more than a disabled taxi driver's case. The law, like a good prosthetic, is designed to make a person whole, nothing more, nothing less."[48]

As it was described earlier, there is a chance for a bionic prosthesis to malfunction, so this technology has to be strictly regulated by the rules of law. The EU legal regulation of prostheses will be used as an example of how bionic prostheses are regulated by current laws in the Civil Law system.

It is assumed that prostheses fall under the definition of the Article 2 of the EU Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products.[49] Prostheses are considered to be "active implantable medical devices" and they also fall under the EU Council Directive 90/385/EEC of 20 June 1990 on the approximation of the laws of the Member States relating to active implantable medical devices.[50] Directive 85/374/EEC notices the subject of accountability of the manufacturer of prostheses, by specifying upon which circumstances the manufacturer would be held accountable for the damages emerging from malfunctioning of a prosthesis.[51] Directive 90/385/EEC determines technical standards that a prosthesis is demanded to comply to be commercialized on the EU marker.[52]

[47] Id.
[48] Id.
[49] See note 23, p. 121.
[50] Id, p. 121.
[51] Directive 85/374/EEC.
[52] Directive 90/385/EEC.

It seems that bionic prostheses are well legally regulated. Yet, an important dilemma of bionic prostheses that most of other robotic technologies doesn't have is that the use of prostheses can't be restricted prior an accident. The same grip of a bionic prosthesis is used for many different tasks. In one scenario, malfunctioning a bionic prosthesis might drop something, while in another scenario a bionic prosthesis can injure someone by using a tool with the exact same grip. It is futile to predetermine all the possible risks in regards to the use of bionic prostheses.[53]

The other issue that originates from the use of bionic prostheses is that a bionic prosthesis is controlled directly by the brain of its owner, which makes it, at least in theory, possible that the owner might learn to use a bionic prosthesis in a way that have not been thought of by the manufacturer.[54] If this would be a case, then a problem mentioned above - predetermining all the possible risks - would become even more deteriorated.

The legal issues that only bionic prostheses causes, differentiates them from regular prostheses. As an outcome of the legal issues mentioned in this Section, there is a need for different set of the rules of law that would specifically consider only bionic prostheses, because the rules that currently applies to such prostheses doesn't cover what needs to be covered. In regards to the technological breakthrough and fast development of bionic prostheses, the owner of a bionic prosthesis might be at risk since bionic prostheses aren't regulated by specific laws and one can't be certain if his a bionic prosthesis will not malfunction.

Therefore, a conclusion is to be made that bionic prostheses are different from regular prostheses. This makes it necessary to create a new legal regulation for bionic prostheses, so they would be legally regulated in a more accurate way.

[53] See note 23, p. 119.
[54] Id, p. 121.

2. SUMMARY OF THE DEFINITION OF A PART OF A HUMAN BODY AND ITS LEGAL REGULATION

In Subsection 2.1 it is defined what a part of a human body is. In Subsection 2.2 it is explained how a human body is legally regulated and what problems such legal regulation creates. Then it is explained what a transplantation of parts of a human body is.

2.1. Definition of a Part of a Human Body

Since the main goal of the Master's Thesis is to find an answer to whether a bionic prosthesis should be considered as a part of a human body, it is necessary to understand what a part of a human body is. A human body is a "physical structure, including the bones, flesh, and organs […]"[55]. A part of a human body is "any part of an organism such as an organ or extremity"[56]. From this definition it is clear that conception of a part of a human body applies for internal organs and extremities, as arms or legs.

As of the formation of a human body, at first, there is an embryo in mother's body. An embryo is created from one single cell that divides, resulting in millions of cells that form a human body. As the embryo grows in the first few weeks, its cells are forming into specialized tissues to form specific organs. This formation is controlled by genetic factors written in the chromosomes from both father and mother. Most of the organs are formed between 5 and 8 weeks of human's life. Therefore, a human body is continuing to grow and develop to the time of being born.[57]

The description above explains that a human body is created due to natural processes happening in mother's body. This means that a human body and parts of it are biological structures.

A human body is able to feel touch, pain, temperature, position, movement, vibration – it has feedback system, which is called somatosensory system. Somatosensory system is neuron system that transits sensations of a human body to the brain, in a form of impulses.[58] However, some people has condition such as congenital insensitivity to pain – these people can't feel any pain[59].

In some cases a human body may malfunction. There are many illnesses and other factors that affects a human body in a negative way. There are syndromes as multiple organ dysfunction syndrome, which is a syndrome that creates physiologic derangements in individual organs of a

[55] <https://en.oxforddictionaries.com/definition/body> [accessed on 2017 04 20].
[56] <http://www.thefreedictionary.com/body+part > [accessed on 2017 04 20].
[57] <http://library.med.utah.edu/WebPath/HISTHTML/NORMAL/NORMAL02.html> [accessed on 2017 03 17].
[58] Nida Glaveckas-Martens, *Somatosensory System Anatomy* (2013 07 12); <http://emedicine.medscape.com/article/1948621-overview> [accessed on 2017 02 10].
[59] <https://ghr.nlm.nih.gov/condition/congenital-insensitivity-to-pain> [accessed on 2017 05 09].

human body; organ function can vary from a mild degree of organ dysfunction to completely irreversible organ failure.[60] Even a human body itself does age, which determines a human body to die. These examples shows that a human body could malfunction and eventually stop working at all – a human body dies.

2.2. Legal Regulation of a Human Body

To explain what a legal status of a human body is, Lithuanian law will be used as an example. It is assumed that similar legal regulation applies in most of the countries that are based on the Civil Law or the Common Law legal systems.

As it will be explained in more detail, Lithuanian law, as most of other jurisdictions, hasn't yet determined a legal status of a human body. However, there are laws that apply to a human body and from the perspective of those laws, an analysis will be made of how a human body can be possessed by a human himself or the others.

A human body is protected by the Constitution of the Republic of Lithuania. Article 19 of the Constitution states that "[t]he right to life of a human being shall be protected by law"[61]. Considering that without a body a human can't live, this Article protects the body by protecting the life of a human. In the Article 21 of the Constitution it is stated that "[t]he human person shall be inviolable"[62]. This Article refers to a human person as a whole, including the body, which means that it is forbidden to do any harm to a human body. This Article of the Constitution specifies what is to be prohibited by it: "It shall be prohibited to torture or injure a human being, degrade his dignity, subject him to cruel treatment, or to establish such punishments"[63]. Also, by the same Article it is prohibited to use someone for a scientific or medical experimentation without that person's knowledge and free consent[64].

Article 2.25 of the Civil Code of Lithuania also protects the same rights of a human body, but also expands the prohibitions. By this article it is prohibited for anyone to use a human body, parts of it, organs or tissues as the subjects of commercial contracts[65]. This means that a human body and parts of it can't be subjects of a commercial contract.

From the laws mentioned above it is clear that human body isn't a thing and real rights doesn't apply to it. A human body and parts of it can't be possessed in a way a thing can be possessed. The main difference is that a human can't sell his own body or use it for any other

[60] Ali H Al-Khafaji, *Multiple Organ Dysfunction Syndrome in Sepsis* (2017 03 07); <http://emedicine.medscape.com/article/169640-overview> [accessed on 2017 03 15].
[61] LR Constitution (1992 10 25), Art. 19.
[62] Id, Art. 21.
[63] Id, Art. 21.
[64] Id, Art. 21.
[65] See note 31, Art. 2.25.

commercial contract. However, besides the prohibition of using a body in commercial contract, the rules that applies to a thing and a human body are similar – neither a thing that belongs to a person nor this person's body can be violated by any third party without person's knowledge and free consent.

Summarizing what a legal status of a human body is, it is safe to state that a human body is in its own legal category, which isn't determined by the law yet. Any part of a human body is also in the same legal category and the same rules of law applies to it.

Since a legal status of a human body isn't determined by the law yet, such situation creates legal opacities. Two cases will be given below as an examples of how parts of a human body were interpreted by courts in different ways.

In Moore v. Regents of the University of California case, which took a place at the Supreme Court of California, in 1990, John Moore was diagnosed by hairy cell leukemia. Scientists from the University of California took samples of Moore's cells, which he allowed by signing a written consent. The scientists of the University of California developed a cell line, using Moore's cells, and patented this invention. Later the scientists sold the rights to the cell line to Genetics Institute and earned a lot of money. When Moore became aware of this situation, he brought a lawsuit against the scientists of the University of California. He claimed that for the cell line his property (cells) were used so he has a right to a share of the profit that the scientists of the University of California received. It was held that the cells aren't Moore's property and he has no rights to any profit that originated from his cells[66].

This example shows that legal status of a human body creates legal dilemma – if one can't use his body in every way possible, but then accepts to participate in a medical experiment, where his body is being used as a primary source for creating a product, which brings profit to the manufacturers of that product, does that person has a right to have a share of that profit? As the case mentioned above shows, no, such person couldn't have a share of that profit, because his body isn't considered as his property.

A different situation was in Yearworth v. North Bristol NHS Trust case, which was held at the Court of Appeal of England and Wales, in 2009. In this case six men had to go through the course of chemotherapy at the hospital. The management of the hospital

[66] Radhika Rao, "Genes and Spleens: Property, Contract, or Privacy Rights in the Human Body?", *American Journal of Law, Medicine and Ethics* (2007), p. 372, notion from: USA case: Moore v. Regents of the University of California [1990].

suggested them to supply their sperm so the management would store it for later, because there was a possibility that after the course of chemotherapy it wouldn't be possible for those men to have a healthy sperm and be able to have children. The sperm was frozen, but by hospitals' fault it became damaged, which meant that there was a very high chance that those men would never be able to have children. In regards to this unfortunate situation, five of those men claimed to have a psychiatric illness because of the news they have been told. Men sued the hospital but their lawsuit was dismissed at the first instance. Then those men went to the Court of Appeal of England and Wales, where they claimed to be the owners of their sperm and the hospital can be sued, because it was hospitals' fault that the sperm was damaged and five of those men had a psychiatric illness because of the bad news. The Court agreed with men.[67]

The decision made in the case above means that in some cases a part of person's body, which isn't in person's body anymore, could be considered as a property of this person. Using these two described cases as an example, it is obvious that there is no main rule of how a human body and parts of it should be legally regulated. Courts doesn't agree one with another and the rulings can be different. The main problem is that there is no clear pattern which direction the law is taking, whether the law is accept that a human body and parts of it are person's property.

In the subject of bionic prostheses transplantation of parts of a human body is important. It is important in a way that if the law allows a person to use part of someone else's body and this transplanted part of someone else's body is considered to be a part of its recipient's body, this means that there is no requirement for a part of a human body to be a natural part of a human body.

For further analysis, it is necessary to have a common knowledge in understanding what a transplantation of parts of a human body is. If a person has a medical condition that could cause his vital organ to fail, human organ transplantation could be one of the treatment options.[68] A human organ transplantation is a surgical operation which leads to giving a functioning human organ to a person whose organ has stopped working or is close to failing.[69] There are many organs that could be transplanted: liver, kidney, heart, etc. Besides internal organs, it is possible to transplant external parts of a human body:

This kind of transplantation of parts of a human body is called vascularized composite allotransplantation. Vascularized composite allotransplantation is transplantation

[67] <https://mcbridesguides.files.wordpress.com/2013/09/yearworth-v-north-bristol-nhs-trust.pdf> [accessed on 2017 04 01], notion from: UK case: Yearworth v. North Bristol NHS Trust [2009].
[68] See note 2.
[69] Id.

of a limb or a face as multiple tissue derivative, not as a single organ. The concept of multiple tissue includes human tissues such as muscle, bone, nerve, skin being replaced as a single part of a human body. Functionality of transplanted part of a human body depends on its receiver's nerve growth rate.[70]

In pursuance of making it clear, whether a transplanted part of a human body is considered as a part of its recipient's body, the author of the Master's Thesis made a contact with the National Transplant Bureau in Lithuania to ask for a reliable answer. The author of the Master's Thesis asked if a transplanted part of a human body is considered to be a part of its recipient body. The answer came from the National Transplant Bureau Department of Transplantation Coordination Senior Specialist Sonata Lukrecija Karčiauskaitė:

" ... A transplanted [part of a human body] is considered as [a part of its recipient's body]. If a transplanted [part of recipient's body] would be injured, a deed would be qualified as a bodily injury in respect to the adequate article of the Criminal Code of the Republic of Lithuania. A [part of a human body] can't be equated to a thing and [an injury to a part of a human body] can't be qualified as a damage of a thing, because [parts of a human body] aren't objects that could be in a market in regards to the Civil Code of the Republic of Lithuania".[71]

Since a transplanted part of a human body is considered as a part of its recipient's body, it is only logical to compare a natural part of a human body to a transplanted part of a human body. As there is no requirement for a part of a human body to be natural to its recipient, it is necessary to compare the features of a natural part of a human body and a transplanted part of a human body in order to analyze if there are any important differences. These differences would be discussed later in order to find an answer to whether a bionic prosthesis should be considered as a part of a human body.

The table below consists of two main subjects: a natural part of a human body and a transplanted part of a human body. These subject are compared in 5 different sections: origin, functionality, feedback, possibility of malfunctioning and future predictions. These sections were chosen in regards to the issues discussed earlier. As of the substantiation for the answers, all the material they are based on has been analyzed in the Master's Thesis.

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70 <https://www.myast.org/public-policy/key-position-statements/vascularized-composite-allotransplantation-vca-research> [accessed on 2017 04 13].

71 Sonata Lukrecija Karčiauskaitė, author's interview (electronic mail, 2017 01 30). Translated by the author from Lithuanian language.

Table No. 1. Comparison of a natural part of a human body and a transplanted part of a human body.

	Origin	Functionality	Feedback	Possibility of malfunctioning	Future predictions
Natural part of a human body	Develops as an outcome of natural processes happening in a human body.	It depends on person's physical state.	It has feedback, but there are exceptions.	Malfunctioning is possible.	No future predictions available.
Transplanted part of a human body	Develops as an outcome of natural processes happening in a human body. Not natural to its receiver.	It depends on person's nerve growth rate.	It has feedback, but there are exceptions.	Malfunctioning is possible.	No future predictions available.

Results of the comparison:

1. Origin: both of the subjects of comparison develops as an outcome of natural processes happening in a human body, yet, a transplanted part of a human body isn't natural to its receiver;
2. Functionality: both of the subjects of comparison depends on many factors, such as physical state or nerve growth rate, and functionality could vary;
3. Feedback: both of the subjects of comparison has feedback, but there are exceptions, so a feedback could vary;
4. Malfunctioning: both of the subjects of comparison has a possibility of malfunctioning;
5. Future predictions: no future predictions could have been done.

As the results of the comparison shows, the main difference between a natural part of a human body and a transplanted part of a human body is their origin – a transplanted part of a human body isn't natural to its receiver. Other points of comparison are considered to be similar.

Therefore, a conclusion is to be made that a human body and parts of it are in their own legal category, which isn't determined by the law yet. An analysis showed that a transplanted part of a human body is considered as a part of its recipient's body. This finding led to making a conclusion that there is no requirement for a part of a human body to be a natural part of a human body.

3. RESEARCH METHODOLOGY AND THE RESEARCH

In Subsection 3.1 it is explained what methods of the research were chosen and for what reasons. Then task and hypothesis of the research are stated. In Subsection 3.2 the research is made.

3.1. Research Methodology

Research methodology is based on a textbook "Research methods for business students" written by Mark Saunders, Philip Lewis and Adrian Thornhill[72].

Methods of the research. For the reasons of making the research as accurate as possible, there will be three methods used: **the case study**, **the interview of the experts** and **the comparative analysis**.[73] All of these methods are **qualitative methods of the research**.[74] The case study is necessary to analyze practical cases in order to compare the information gathered from practical cases to the information gathered in the theoretical part of the Master's Thesis. The interview of the experts is necessary to ask opinion leaders if they think that a bionic prosthesis should be considered as a part of a human body; to ask for professional future predictions on bionic prostheses. The comparative analysis is necessary in order to analyze the main differences between a bionic prosthesis and a part of a human body in order to reach a conclusion if a bionic prosthesis should be considered as a part of a human body.

Other methods of the research couldn't have been made for extensive reasons. An experiment isn't possible because of the shortage of time and resources. A survey isn't possible, because, in regards to the technical aspects of bionic prostheses, public's opinion couldn't be a reliable source, since the public doesn't have all the necessary knowledge in the field of bionic prostheses.

Ethics. The author of the Master's Thesis declares that the research is to be accomplished in an objective and unprejudiced way. The author has no interest in supporting one opinion over the other. The experts that were chosen for the interview of the experts aren't related to the author in any way and no prior contact was made.

Task of the research: To compare the features of a bionic prosthesis and a natural part of a human body.

Hypothesis: If a bionic prosthesis does everything equally, or better, to a respective part of a human body, it should to be considered as a part of a human body.

[72] Mark Saunders, Philip Lewis, Adrian Thornhill, *Research Methods for Business Students. Fifth Edition* (2009).
[73] Id.
[74] Id.

Possible outcomes of the research:

1. The features of a bionic prosthesis are same or similar to a natural part of a human body and a bionic prosthesis has to be considered as a part of a human body;
2. The features of a bionic prosthesis aren't same or similar to a natural part of a human body and a bionic prosthesis can't be considered as a part of a human body.

3.2. Research

3.2.1. Case Study

There were 2 cases chosen for the case study. These cases doesn't introduce bionic prostheses, however, they are important to the subject of bionic prostheses, since they deal with the issues of regular prostheses being considered as parts of a human body.

"National Union Fire Insurance Company" of Pittsburgh, Pennsylvania v. Janes:

Table No. 2. "National Union Fire Insurance Company" of Pittsburgh, Pennsylvania v. Janes.

Case	*In "National Union Fire Insurance Company" of Pittsburgh, Pennsylvania v. Janes case, which took a place at the Court of Appeals of Texas, in 1985, a question of whether a metal plate in appellant's body applies for Workers' Compensation, was analyzed. An appellant Jerry Dean Janes got his right femur injured. The femur was treated by placing a metal compression plate on it, which held the femur jointly. However, one day, while Janes was doing his job at the "Western Company", where he worked, his metal compression plate had broken. Janes went to the hospital, where he was suggested to get his old metal compression plate surgically removed and another metal compression plate put in the same place. Janes brought a lawsuit against "Western Company's" Workers' Compensation insurance carrier. It was found that he had forty percent permanent partial loss of use of his right leg. In the process of litigation, his lawsuit went to the Court of Appeals of Texas, which judgement was not in favor of Janes.*[75]
Resolution	*The Court of Appeals of Texas ruled against Janes. The main aspect of this judgment was that there was no proof of Janes getting his body injured. In Worker's*

[75] <http://www.leagle.com/decision/19851509687sw2d822_11401/nat. union fire ins. co. of pittsburgh v. janes> [accessed on 2017 03 15], notion from: USA case: "National Union Fire Insurance Company" of Pittsburgh, Pennsylvania v. Janes [1985].

	Compensation laws of Texas there was a mandatory clause which allowed to consider a person injured only if his body was injured.[76]
Conclusion	In this case a person with a metal compression plate in his body was not applicable for a Workers' Compensation, because the court interpreted the law word for word and if there was no physical damage to person's body, even though his broken metal compression plate made him unable to use his leg as he was able to use it before an accident, person couldn't be applicable for Workers' Compensation.

Case study: Ethical and Legal Issues in Human Machine Mergers (Or the Cyborgs Cometh):[77]

Table No. 3. Case Study: Ethical and Legal Issues in Human Machine Mergers (Or the Cyborgs Cometh).

Case	*In this case question where is the line between a mobility assistance device as a thing and a mobility assistance device as an extension of a human body was risen. The case was represented by Linda MacDonald Glenn, an assistant Professor in the Department of Medical Education at Albany Medical College, who had worked on this case. The name of the case was not given by Glenn, also, names of the parties of the case were changed by Glenn due to protecting parties' privacy.* *Mr. Collins is a disabled Vietnam War veteran, who is recognized as a 100 percent disabled. He can't use neither of his legs, he can't use one of his arms and he can barely use his other arm. In regards to his condition, he isn't able to use a manual wheelchair, because there is a possibility for Mr. Collins to be unable to breathe if he would put himself in a specific position in such wheelchair. Due to Mr. Collins' service to the USA as a soldier, the Department of Veterans Affairs awarded him with a mobility assistance device (further - MAD). Mr. Collins is depended on MAD, because without it he wouldn't be able to move from his bed.* *In 2009, Mr. Collins' MAD was damaged beyond repair by "Allways Airlines" and Mr. Collins couldn't use it anymore. He made a claim for "Allways Airlines" to compensate the cost he spent for not being able to use his MAD. Since Mr. Collins was not able to move from his bed without anyone's help, he had to hire people to do tasks for him. Also, as an outcome of Mr. Collins being not able to move from his bed, he suffered bed sores for 11 months, till he received another MAD. Mr. Collins sought for an award for his suffering.*

[76] Id.
[77] The name of the original source was not disclosed in the source.

	"Allways Airlines" denied the claim. Although "Allways Airlines" accepted the damage to the MAD, they didn't accept the damage made to Mr. Collins. "Allways Airlines" compared this accident to a notional accident where a vehicle, without anyone inside of it, is damaged. The main problem was that "Allways Airlines" didn't understand the difference between a manual wheelchair and the MAD. They were showed a video demonstration which pointed out those differences. Glenn wrote: *"We explained that modern day prosthetics no longer consists of inanimate separate objects; that interactive prosthetics are the new normal [...].And the interactive prosthetics are changing who we are, physically – who would Stephen Hawking be without his assistive devices? The MAD was an extension of Mr. Collins; by harming his MAD, the harm extended to Mr. Collins."*[78]
Resolution	*After being explained the differences between a manual wheelchair and the MAD, "Allways Airlines" accepted Mr. Collins' claim and offered him a fair amount of money for what he had suffered in regards to the loss of his MAD.*[79]
Conclusion	This case shows that the line between a thing and something personal to a person is blurring. Even if the law doesn't accept a thing as an extension of a human body, for a person, who is dependent on that thing, it might be an extension of his body, because with that thing he is able to do much more than without it. As this case shows, the MAD can't be compared to a vehicle, because without a vehicle a person is not suffering a disability, while a person who loses his MAD can't even move from his bed for almost a year.

Conclusions of the case study. It is safe to state that things that helps a person to use his body and to function as a normal human being aren't easily accepted as parts of a human body. However, as the second case shows, after the explanation of what the MAD is, how it helps its owner and how it is different from a regular wheelchair, the company that destroyed person's MAD accepted to pay for person's suffering due to the loss of his MAD. This shows that the issue of not accepting things as parts of a human body might be that the society don't have the knowledge in this area, so it can only see things as a property. A better education of this area could be a solution.

[78] Linda MacDonald Glenn, *Case Study: Ethical and Legal Issues in Human Machine Mergers (Or the Cyborgs Cometh)*; <http://www.academia.edu/1473965/Case_study_Ethical_and_Legal_Issues_in_Human_Machine_Mergers_Or_the_Cyborgs_Cometh> [accessed on 2017 04 29].
[79] Id.

3.2.2. Interview of the Experts

There were 12 experts chosen for the interview of the experts. They were contacted via electronic mail. 2 of the experts that were contacted have replied. Both of these experts are professionals in the field of bionic prostheses and they are held as opinion leaders of this subject. They are considered to be reliable and trusted sources for the research because of their experience and knowledge in the field of bionic prostheses.

Expert No. 1: Jon D. Lichtenstein, a lawyer and a partner at Gordon & Silber law firm in the New York City, USA. He is a co-chair of the Cyborg Law subcommittee of the New York City Bar Association Science and Law Committee. He is an author whose articles were used in the Master's Thesis. He is also an author of the internet blog "The Rights of Cyborgs", where he writes about bionic prostheses.

Expert No. 2: Frederick Downs Jr., a retired national director of the USA Department of Veterans Affairs Prosthetic and Sensory Aids Service. He is a Vietnam War veteran – he had lost his left arm at the war. He uses a bionic prosthesis – a bionic arm "Deka".

There were 5 questions given to the experts. All of the questions are open-ended so the experts could share their thoughts in an unrestrained way.[80] The questions are connected to all the material discussed in the Master's Thesis prior to the research.

Both of the experts, Jon D. Lichtenstein and Frederick Downs Jr., have provided different answers to the same questions meaning the difference of their opinions. It is safe to state that the research has been productive since the answers of the experts are very different and only critical conclusions can be made. Unedited questions and answers can be found in the Annex.

Table No. 4. Analysis of the interview of the experts.

Question No. 1	The experts were asked if bionic prostheses will ever be as good as parts of a human body. This question is necessary to get basic opinions of the experts; what do they think about the future of the bionic prostheses looking from today's perspective. Jon D. Lichtenstein: *Bionic prostheses will be even better than parts of a human body and there is no reason for limiting bionic prostheses to the range of parts of a human body. However, in his opinion, bionic prostheses will not reach the state where they are as good as parts of a human body for a long time.*[81]

[80] See note 72.
[81] Jon D. Lichtenstein, author's interview (electronic mail, 207 04 06).

	Frederick Downs Jr.: It isn't likely that bionic prostheses will ever be as good as parts of a human body. The reason for that is that "machinery can't duplicate movement of the human body except in gross terms".[82] In regards to the material analyzed in the Master's Thesis, it seems that the current state of bionic prostheses is still far away from the abilities of parts of a human body and the experts agrees with that. It is important that the first question wasn't limited to the current state of bionic prostheses. Jon D. Lichtenstein considered the factor of technological progress, while Frederick Downs Jr. didn't. For this reason, Jon D. Lichtenstein's answer is considered as more reliable.
Question No. 2	The experts were asked what would be the problems of legal regulation in which bionic prostheses would be considered as parts of a human body. This question is necessary, because in the theoretical part of the Master's Thesis there was a discussion about a few possible problems originating from such legal regulation. If the answers of the experts would address those problems, this would mean that the problems are important and needs to be addressed by the law. Jon D. Lichtenstein: *"Where a wealthy individual has multiple prosthetic legs, if any one of them is broken or damaged, he has suffered property damage. He can merely swap the leg and get the damaged one fixed. He has suffered no disability/personal injury and should only be able to recover the cost of the repair/replacement. If however, a person has one prosthetic leg and had to mortgage his house to afford it, damage to that prosthetic leg clearly causes that person a personal injury, although no jurisdiction currently acknowledges such."*[83] Frederick Downs Jr.: The problem would be that a bionic prosthesis can be replaced, while human limb can't.[84] While Jon D. Lichtenstein's point of view provides interesting ideas, Frederick Down's Jr. answer isn't based on the current science. As it was explained earlier, transplantation of a human limb is possible - it is called

[82] Frederick Downs Jr., author's interview (electronic mail, 2017 04 11).
[83] See note 81.
[84] See note 82.

	vascularized composite allotransplantation. Because of Frederic Down's Jr. answer not being based on the current science, Jon D. Lichtenstein's answer is considered as more reliable.
Question No. 3	The experts were asked if in a scenario, where a bionic prosthesis is even better than a natural part of a human body and it is considered as a part of a human body, wouldn't that be unfair for the people that doesn't own bionic prostheses. This question make the experts to imagine themselves in a situation, where they need to state rules for the use of bionic prostheses. Jon D. Lichtenstein: *In sports there should be two types of events, for people without bionic prostheses and for people who has them. When talking about daily living, Jon D. Lichtenstein thinks that this kind of difference in living shouldn't be regulated, unless non-regulatory system would allow an invasion of others' lives.*[85] Frederick Downs Jr.: If a bionic prosthesis is better than a natural part of a human body, this kind of difference couldn't be legally equal and should be separated in different categories.[86] For this question, the experts had different opinions. Jon D. Lichtenstein thinks that the differences of people who has bionic prostheses and who don't have them should be treated differently only in such activities as sports, but not in a daily living. Meanwhile, Frederick Downs Jr. says that such differences should be treated differently in all the cases.
Question No. 4	The experts were asked whether a bionic prosthesis should be considered as a part of a human body. This is the main question of the Master's Thesis. To reach the final conclusion it is very important to base it not only on theory and literature, but also on the opinions of the experts, because of their experience and deduction. Jon D. Lichtenstein answered using amputee's Hugh Herr's, words: "When you are able to feel the grass beneath your bionic toes, the prosthetic will be you".[87] By using this quote Jon D. Lichtenstein meant that when a bionic prosthesis will have a feedback system, it will be equal to a natural part of a

[85] See note 81.
[86] See note 82.
[87] See note 81.

	human body. In Frederick Downs' Jr.: A bionic prosthesis could only be a substitute for a part of a human body.[88] For this question, opinions of the experts were different. Jon D. Lichtenstein thinks that a bionic prosthesis should be considered as a part of a human body as soon as it has a feedback system. It is important to state that bionic prostheses already has feedback systems, although current prostheses that has feedback systems are more expensive than prostheses that doesn't have them. By the logic of Jon D. Lichtenstein, bionic prostheses should currently be considered as parts of a human body. Frederick Downs Jr. doesn't agree with that and says that a bionic prosthesis could never be considered as a part of a human body.
Question No. 5	The experts were asked if they have any additional comments regarding the subject of bionic prostheses. The experts were asked this question so they could share what they couldn't address through the first four questions. Jon D. Lichtenstein suggested to visit his internet blog "The Rights of Cyborgs" for more information regarding the subject of bionic prostheses. In the opinion of the author of Master's Thesis, for the reader of Master's Thesis to read Jon D. Lichtenstein's internet blog would be a great addition in gaining more knowledge about bionic prostheses legal regulation. Frederick Downs Jr.: "The bionic limb is too complicated and complex to become a viable replacement for the human limb. It can be made to do particular functions in a limited manner but it can't replicate the human limb".[89]

Conclusions of the interview of the experts. From the interview of the experts it is clear that opinion leaders of the subject of bionic prostheses has different opinions on whether a bionic prosthesis should be considered as a part of a human body. This means that the issue is important ant needs to be discussed about.

Since Jon D. Lichtenstein's answers are based on the current science and technology progress, his answers are considered to be more reliable than the answers of Frederick Downs Jr. Jon D. Lichtenstein suggests that a bionic prosthesis should be considered as a part of a human body as soon as it has a feedback system. Some of bionic prostheses already has such system, so from the

[88] See note 82.
[89] See note 82.

logic of Jon D. Lichtenstein, a bionic prosthesis should currently be considered as a part of a human body.

3.2.3. Comparative Analysis

Table below consists of three main subjects: a natural part of a human body, a transplanted part of a human body and a bionic prosthesis. These subjects are compared in 5 different sections: origin, functionality, feedback, possibility of malfunctioning and future predictions. These sections were chosen in regards to the issues discussed earlier. The author of the Master's Thesis highlights that the sections were chosen in regards to the issues discussed earlier and a more expanded comparison is possible, however, for the task that the author is trying to accomplish, a comparison as it is covers everything that needs to be covered. As of the substantiation for the answers, all the material they are based on has been analyzed in the Master's Thesis.

Table No. 5. Comparative analysis.

	Origin	**Functionality**	**Feedback**	**Possibility of malfunctioning**	**Future predictions**
Natural part of a human body	Develops as an outcome of natural processes happening in a human body.	It depends on person's physical state.	It has feedback, but there are exceptions.	Malfunctioning is possible.	No future predictions available.
Transplanted part of a human body	Develops as an outcome of natural processes happening in a human body. Not natural to its receiver.	It depends on person's nerve growth rate.	It has feedback, but there are exceptions.	Malfunctioning is possible.	No future predictions available.
A bionic prosthesis	Made using technologies.	It depends on a bionic	Some of the newest	Malfunctioning is possible.	It will work as good as a

	Not natural to its receiver.	prosthesis. Most of them has a few different grip functions.	models has feedback.		natural part of a human body.

Results of the comparative analysis:

1. Origin: a natural part of a human body and a transplanted part of a human body develops as an outcome of natural processes happening in a human body, yet, a transplanted part of a human body isn't natural to its receiver. A bionic prosthesis is made using technologies and isn't natural to its receiver.
2. Functionality: all of the subjects of the comparative analysis depends on many factors, such as physical state, nerve growth rate or a subject itself, and functionality could vary;
3. Feedback: all of the subjects of comparative analysis has feedback, but there are exceptions, so a feedback could vary;
4. Malfunctioning: all of the subjects of comparative analysis has a possibility of malfunctioning;
5. Future predictions: as of a natural part of a human body and a transplanted part of a human body, no future predictions could have been done. As of a bionic prosthesis, a prediction is made that it will work as good as a natural part of a human body.

Conclusions of the comparative analysis. As it is seen from the results of the comparative analysis, the main difference between a bionic prosthesis and a natural part of a human body is that a bionic prosthesis is made using technologies and isn't natural to its receiver. Yet, a transplanted part of a human body isn't natural to its receiver, but it is considered as a part of its receiver's body. This means that the only feature of a bionic prosthesis – being made using technologies – is a scarcity to be considered as a part of a human body.

4. SUMMARY OF THE DATA OF THE RESEARCH AND SUGGESTIONS FOR A LEGAL REGULATION OF BIONIC PROSTHESES

In Subsection 4.1 the data collected in the Master's Thesis is analyzed. In Subsection 4.2 suggestions for a legal regulation of bionic prostheses are given.

4.1. Analysis of the Data

At this point, all the necessary information to state whether a bionic prosthesis should be considered as a part of a human body is collected. At first, it was analyzed what a bionic prosthesis is and how it is legally regulated. Then it was discussed how a human body and parts of it are legally regulated. Lastly, the research was made and it gave most of the answers to the questions from the theoretical part of the Master's Thesis.

As the examples, as the Case Study: Ethical and Legal Issues in Human Machine Mergers (Or the Cyborgs) shows, sometimes a thing can be something personal to its owner. Even though the law wouldn't see that thing as something personal, for its owner it would be. Further, as the comparative analysis showed, the main difference between a bionic prosthesis and a natural part of a human body is the origin of a bionic prosthesis – it was made using technologies and isn't a biological structure. This difference doesn't seem as an important reason for a bionic prosthesis not to be considered as a part of a human body, since accepting a bionic prosthesis as a part of a human body would bring a lot of benefits for the owners of bionic prostheses. As the examples analyzed in the Master's Thesis showed, current legal regulation of bionic prostheses creates a lot of issues for their owners: medical insurance for prostheses is limited; if a bionic prosthesis gets damaged and for this reason its owner can't act as a normal functioning human being, he wouldn't get any kind of compensation for his disability due to his damaged prosthesis; in most cases the owner of a prosthesis would only get a reward for damaged prosthesis, but not for his suffering.

Also, bionic prostheses technology isn't perfect. The law, by not approaching these issues, leaves a space for accidents or for the manufacturers to act in an arbitrary way.

As it would seem from all the cases analyzed in the Master's Thesis and from the interview of the experts, there is no main opinion on how bionic prostheses should be legally regulated. One is clear – current legal regulation isn't the best option for the owners of bionic prostheses and it doesn't cover everything that needs to be covered. Technologies are changing and the law has to go with it in order to regulate everything correctly and not leave any opacities in any legal regulation.

In conclusion, a bionic prosthesis should be considered as a part of a human body. Current legal regulation that applies for bionic prostheses isn't fair for their owners and it doesn't regulate

specific details of bionic prostheses. The main difference of a bionic prosthesis and a part of a human body – a bionic prosthesis not being a biological structure - might be argued as an issue of ethics, however, ethics and a human perception has a tendency to change. A few hundred years ago the Church was burning "witches", now it says that it is fine for Catholics to believe in aliens.[90] It is only a matter of time, when a bionic prosthesis will be as usual as a natural part of a human body.

4.2. Suggestions for a Legal Regulation of Bionic Prostheses

The author of the Master's Thesis suggest a legal regulation where a bionic prosthesis is considered as a part of a human body without any restrictions. An analysis of legal regulation suggested by Jon D. Lichtenstein might work in some cases, however, the author of the Master's Thesis wouldn't agree with it. In Jon D. Lichtenstein's legal regulation there are three requirements for a bionic prosthesis to be considered as a part of a human body: a person has to own only one a bionic prosthesis; this person has to be injured through his a bionic prosthesis; an injury to person's bionic prosthesis has to have an effect of disability. The author of the Master's Thesis thinks that such legal regulation doesn't approach all the issues of bionic prostheses by such limitations.

It is suggested for a bionic prosthesis to be considered as a part of a human body without any restrictions. While assuming that the main goal of every person is to live a normal life and enjoy it, it would only be fair to allow them to improve their disabled bodies with technologies and no unnecessary limitations for such people would be made. After all, it isn't far from a time when bionic prostheses will be as good as natural parts of a human body. However, as it was discussed earlier, current legal regulation of bionic prostheses doesn't approach specific issues of bionic prostheses, so there would be a need for more adequate laws in regards to bionic prostheses and their manufacturing.

[90] *Vatican: It is OK for Catholics to Believe in Aliens* (2008 05 13); <http://www.foxnews.com/story/2008/05/13/vatican-it-ok-for-catholics-to-believe-in-aliens.html> [accessed on 2017 05 01].

CONCLUSIONS

1. The first task was to summarize the definition of a bionic prosthesis and its legal regulation. It was explained what a bionic prosthesis is, how it works and how bionic prostheses are legally regulated. A bionic prosthesis is a prosthesis that is connected to its owner's body and brain through micro-sensors. The owner of a bionic prosthesis is able to control the prosthesis only by his mind. It is because of technologies that allows reading signals of the brain and transforming them into movements of a bionic prosthesis. A bionic prosthesis allows its owner to perform a lot more tasks than a regular prosthesis would. In the eyes of law, a bionic prosthesis is considered as thing and real rights applies to it – it is its owner's property. In the USA most of the Workers' Compensation statutes doesn't apply for a damaged or destroyed prosthesis. Also, most of insurance plans has annual or lifetime limitation for prostheses. Nonetheless, situation is changing and some of these limitations are being restricted. In regards to tort law, it was showed that it has tendency to change and such tendency means that the courts might be able to apply the same rules for bionic prostheses as are applied for parts of a human body. Based on this tendency, lawyer's Jon D. Lichtenstein's thoughts on how bionic prostheses should be legally regulated were analyzed. He suggests that if a person owns one prosthesis, which is crucial to its owner, and this prosthesis gets damaged, the prosthesis is considered to be a part of its owner's body. Then it was investigated what are the issues of bionic prostheses legal regulation in the EU. As it turned out, this legal regulation doesn't address issues in regards to bionic prostheses specifically.

2. The second task was to summarize the definition of a part of a human body and its legal regulation. It was explained what a human body is and what issues does it have. Then it was analyzed how of a human body is legally regulated. It was explained that the concept of a human body isn't defined by the law yet. There were given two cases: in one of them a part of a human body wasn't considered as property, while in the other case the court considered a part of a human body to be person's property. This example shows that there is no main opinion on whether a human body and parts of it are person's property. Then transplantation of parts of a human body was analyzed. Transplantation of parts of a human body is important for the subject of bionic prostheses, because, if a transplanted part of a human body is considered to be a part of its recipient's body, this would mean that there are no requirement for a part of a human body to be natural part of a human body. As it was explained, a transplanted part of a human body is considered a part of its recipient's body. This disparity had risen a need for a comparison of a natural part of a

human body and a transplanted part of a human body. As the results shows, the difference between a natural part of a human body and a transplanted part of a human body isn't very significant, except that a transplanted part of a human body isn't natural to its receiver.

3. The third task was to create research methodology which would allow to compare the features of a bionic prosthesis and a part of a human body and to perform the research. There were chosen three methods of the research: the case study, the interview of the experts and the comparative analysis. All of these methods of the research were executed and they were useful for accomplishing the main goal of the research – comparing the features of a bionic prosthesis and a part of a human body. The case study didn't involve bionic prostheses, because there are no cases yet regarding bionic prostheses, however, cases from the case study have been a great use. They showed that while one doesn't consider a metal plate inside someone's body as a part of his body, the other sees a mobility assistance device as a part of a human body. The interview of the experts was also a great help in order to learn opinion leaders' thoughts on whether a bionic prosthesis should be considered as a part of a human body. As the results shows, the experts don't have one opinion. The comparative analysis showed the main differences between a natural part of a human body, a transplanted part of a human body and a bionic prosthesis. From the results it seems that these three subjects of comparison aren't very different from each other, except that a bionic prosthesis isn't a biological structure.

4. The fourth task was to summarize data of the research and to give suggestions for a legal regulation of bionic prostheses. The data that has been collected in the Master's Thesis was analyzed and the conclusion of whether a bionic prosthesis should be considered as a part of a human body was reached. It was stated that a bionic prosthesis should be considered as a part of a human body. It was suggested that there should be no legal boundaries for a bionic prosthesis to be considered as a part of a human body, since bionic prostheses are similar to parts of a human body and it is only logical to allow people have all the benefits for their bionic prostheses as for natural parts of their bodies.

RECOMMENDATIONS

For the researchers of the subject of a legal regulation of bionic prostheses it is recommended to develop the research by analyzing specific topics in more detail:

1. Technical aspects of bionic prostheses;
2. Legal regulation of a human body;
3. Transplantation of parts of a human body;
4. Human organ trade;
5. Other topics connected to the subject of legal regulation of bionic prostheses.

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ANNEX

1. Question to the National Transplant Bureau Department of Transplantation. Unedited question and answer.

Question: Ar transplantuotas organas yra laikomas tikru gavėjo organu? Pavyzdžiui, ar sužeidus tokį organą, būtų įvykdytas kūno sužalojimas, ar, jei organas priklauso kažkam kitam, daikto sugadinimas? **Sonata Lukrecija Karčiauskaitė:** *Organas – gana autonomiška žmogaus kūno dalis, sudaryta iš skirtingų audinių, turinti savo struktūrą, kraujagyslių sistemą, atliekanti fiziologines funkcijas. Organu taip pat vadinama organo dalis, jeigu ji atlieka viso organo funkciją ir atitinka jo struktūrą ir kraujagyslių sistemą. Transplantuotas organas yra laikomas gavėjo (recipiento) organu. Sužeidus transplantuotą recipiento organą, veika būtų kvalifikuota kaip kūno sužalojimas pagal atitinkamą LR BK straipsnį. Organas negali būti prilyginamas daiktui ir organo sugadinimas negali būti kvalifikuotinas kaip daikto sugadinimas, kadangi organai nėra daiktai, kurie galėtų būti civilinėje apyvartoje pagal CK.*

2. The interview of the experts. Unedited questions and answers.

Question No. 1	**Question:** Considering present state of the industry of bionic prostheses, will bionic prostheses be ever as good as parts of a human body? Please rate the possibility of this on the scale from 1 to 5, 1 being "not likely" and 5 being "most likely". Please base your opinion in 2 – 3 short sentences. **Jon D. Lichtenstein:** *While this isn't my area of expertise, the answer appears to be that bionic prostheses will have different abilities. There is no reason to limit them to the range of human body parts. Bionic eyes will be able to see in various wavelengths that human eyes don't. Therefore, from an early phase they will be better than human eyes in some respects. There is no reason they will not be capable of an extreme zoom like a camera unless constrained by ethical issues. I*

	suppose eventually they will obtain similar general purpose capabilities but I think the answer is that bionic prostheses will provide different capabilities but creating them with equal or better general purpose capabilities will not be for some time. **Frederick Downs Jr.:** *Not likely. Machinery can't duplicate movement of the human body except in gross terms.*
Question No. 2	**Question:** If bionic prostheses would be considered as parts of a human body, what would be the problems of such legal system? Please share your thoughts in 2 – 3 short sentences. **Jon D. Lichtenstein:** *The problem as I detailed in my article in the New York Law Journal is that it makes sense to erase the distinction between bodily injury and property damage in certain situations, but not others. Where a wealthy individual has multiple prosthetic legs, if any one of them is broken or damaged, he has suffered property damage. He can merely swap the leg and get the damaged one fixed. He has suffered no disability/personal injury and should only be able to recover the cost of the repair/replacement. If however, a person has one prosthetic leg and had to mortgage his house to afford it, damage to that prosthetic leg clearly causes that person a personal injury, although no jurisdiction currently acknowledges such. Likewise, if that person's replacement prosthetic is sub-standard and he becomes partially disabled as a result, he has suffered a personal injury, and there is no good reason why that person shouldn't be able to recover for lost time from work and lost enjoyment of life. The problem here is that the Courts everywhere deny personal injury recovery to disabled persons who lose the ability to function due to injuries to their prosthetics. As prosthetics become more sophisticated and expensive, this injustice will increase and become more prevalent. The erasure of the distinction will provide a unique challenge for the courts. Juries will have to be asked to apply a socio-economic type test for determining whether someone with a damaged prosthetic has suffered a personal injury. This sounds like a problem, but in reality, the jury is*

	only being instructed to award property damage and personal injury damage if they find any. This would be not really any different to what juries are asked to determine every day. Did the plaintiff suffer a personal injury and if so, what should be the compensation. The only difference is that historically, it that the question was black and white. Was it property damage or was it personal injury? This was a distinction made by the judge not jury. Here, the jury instruction would need to be changed somewhat, but it isn't something that would particular cause trouble to the jury system. **Frederick Downs Jr.:** *The bionic limb can be replaced. The human limb can't.*
Question No. 3	**Question:** Please assume that a bionic prosthesis is even better than a natural part of a human body (stronger, hardier) and it is considered as a part of a human body. Wouldn't that be unfair for the people that doesn't have bionic prostheses? For example, in sports. Please share your thoughts in 2 – 3 short sentences. **Jon D. Lichtenstein:** *There should be two categories of events. Assisted and unassisted. Like the Olympics and the Special Olympics. In the latter the crew mechanic or tech guy would be on the same level or higher than the athlete. It would appeal to a different type of fan. As for the unfairness in normal living, I don't think you would regulate that unless it allowed an invasion of people's private.* **Fredrick Downs Jr.:** *If a bionic limb is superior to a human limb, it shouldn't be legally equal. A human with a superior bionic limb would have to be in a category of its own.*
Question No. 4	**Question:** Finally, whether a bionic prosthesis should be considered as a part of a human body, or not? Please share your thoughts in 2 – 3 short sentences. **Jon D. Lichtenstein:** *As Hugh Herr said, when you are able to feel the grass beneath your bionic toes, the prosthetic will be you. I feel, therefore I am.*

	Frederick Downs Jr.: *A bionic limb isn't a part of the body. It would be a substitute for a part of the human body.*
Question No. 5	**Question:** Also, do you have any additional comments, suggestions or links regarding the topic of the bionic prostheses? Please share your thoughts and knowledge. Jon D. Lichtenstein gave a link to visit his internet blog "The Rights of Cyborgs". **Frederick Downs Jr.:** *The bionic limb is too complicated and complex to become a viable replacement for the human limb. It can be made to do particular functions in a limited manner but it can't replicate the human limb.*