

# *Steroid Use and Special Prostheses: Halachic evaluation of two issues in sports, medicine and technology*

Israel Belfer

This article is the result of recent interest in the subject of steroid use in professional sports and of special prostheses. Some of the issues presented here were analyzed previously in halachic terms, but attention must be given to developments in the field and their formal standing in halacha.

Making radical intrusions into ones body to excel in physical prowess is not a new human enterprise, even in the Jewish tradition:

“And he prepared him chariots and horses and fifty men to run before him”,<sup>1</sup> What is there remarkable in this? — Rab Judah said in Rab's name: They all had their spleen<sup>2</sup> and also the flesh of the soles of their feet<sup>3</sup> cut off<sup>4</sup>

Danger and peril in professional occupations, are also no strangers to pious Jews.<sup>5</sup> Observant Jews must take care that the danger and action do not invoke feelings of personal might.<sup>6</sup> I do

## *Making radical intrusions into ones body to excel in physical prowess is not a new human enterprise*

not presume here to condone or condemn the self-inflicted damage (for example by David's men) and danger (like the Jewish sailors<sup>7</sup>) done by pious Jews. The goal here is to map a formal attitude to the dangers in given situations. Criticism of the policy and education that bring about this endangerment deserves a separate and comprehensive treatment. Neither am I dealing with the spiritual problems<sup>8</sup> arising from the over-emphasis on physical achievement.

In the following, we will address the issues of steroid use, and the use of special prostheses. The steroids will be addressed in the tradition of responsa on danger taking. The new subject of special prostheses in halacha will be treated through the specific cases (such as hearing aids<sup>9</sup>)

Section I will explore the two central aspects of steroid use (lawfulness and health). Section II will deal with the issue of special prostheses in halacha.

## **I. Steroid use in professional sports**

<sup>7</sup> See supra, footnote #5.

<sup>8</sup> These problems date back to the clash between the Jewish and Hellenic civilizations over two thousand years ago. See:

<sup>9</sup> י' שורק, תרבות הגוף בארץ-ישראל בתקופת המשנה והתלמוד, מכון וינגייט, 1977. י"א שורק, המשחק בכדור בחברה היהודית ובתקופת המשנה והתלמוד, ציון ס (ג) (תשנ"ה) עמ' 260-269.

The tension between the Jewish way of life and physical excellence became more complicated with the Zionist movement onward. See: י' שורק; החוק הגופני במשנת הרב קוק, בתוך, א, זמרי (עורך), תרבות הגוף ביהדות, דו"ח סמינר בינלאומי, מכון וינגייט, יולי, 1973 עמ' מ-מ"ז. א, שפיר, הרב קוק וחסו לפעילות גופנית ולספורט; הגיגי גבעה, ד (תשנ"ו), עמ' 14-157.

<sup>9</sup> Even though this does not pertain directly to the sports aspect of the problem, it is nevertheless crucial for the understanding of halacha and man-machine interfaces. This more basic discussion is necessary before regarding the implementation in sports.

<sup>1</sup> I Kings I, 5.

<sup>2</sup> Rashi: The spleen causes a feeling of heaviness. It was removed by use of drugs. The tradition of spleen removal to facilitate swift running is recorded by Plinius; v. Preuss; Biblisch-talmudische Medizin, p. 249. Biblical & Talmudic Medicine; Julius Preuss. trns. ed. Dr. Fred Rosner. ; Pub. Jason Aronson inc., Northvale-New Jersey-London, 1994, The page in the english version, referred to in footnote #2 - p.216.

<sup>3</sup> Rashi: So that they might be fleet of foot and impervious to briars and thorns.

<sup>4</sup> Talmud Bavli, tractate Sanhedrin 21b. (translation: “come and hear”, edited by Rabbi Dr. Isidore Epstein of Jews' College, London)

<sup>5</sup> See Tractate Kiddushin 82a, where the majority of sailors are described as pious (“Rubam Chasidim”) in the danger they live in (“there are no atheists in a foxhole”), and favored by God.

<sup>6</sup> Dvarim 8:17: “My strength and the might of my hand made me this great wealth”.

The use of anabolic steroids for enhancement of physical capabilities in professional sport is an important issue,<sup>10</sup> with disturbing ramifications that reach much further than the sporting arena. There is no attempt here to unravel this problem, which has social and political implications that reach much beyond the medical. On the medical level, the references brought here, while pointing towards dangers, are *not* meant (in scope or depth) to function as a full survey of the issue. For that purpose, the sources and studies themselves *must* be consulted directly.

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There are two levels of approach to this question:

1. The problem of professional misconduct, or more specifically the prohibited subterfuge (“Gneivat HaDa’at”), involved in the steroid use.
2. Self-inflicted harm because of excessive pharmacological intake, constituting a lack of regard for one's own health (“Venishmartem L'nafshoteichem”).

**1. Gneivat Da’at**

Shmuel stated: It is prohibited to steal the mind of any individual<sup>11</sup>

This ruling is interpreted mostly as a criticism of false flattery or friendship,<sup>12</sup> with the victim's understanding<sup>13</sup> playing a central role. Natural conduct that is misconstrued does not fall under Shmuel's ruling.<sup>14</sup> But in cases involving a connection

between the informational deception and actual gains, the ruling characterizes *gneivat da'at* as theft.

Artificially gaining ground in competition in a rule-based setting, is explicitly prohibited halachically, as expressed by Rabbi Moshe Feinstein:

Regarding your question about that which you heard that in (some) yeshivot, (the administration) permits the students to steal the answers to the questions on the state's final examination (regents) in order to deceive (the state into) awarding a degree recognizing satisfactory completion of the material, this is prohibited not only because it is the law of the government but also because it is violation of Torah law. This is not only *gneivat da'at* that is prohibited according to Shmuel ... it is also actual theft because when this person is seeking a job and his employer demands someone who satisfactorily completed his secular studies in high-school, he will show his employer his high-school diploma in order to procure the job and by doing so will violate the prohibition of monetary theft.<sup>15</sup>

The cognitive "theft" - in cases like cheating on exams - leads to real consequences and becomes actual concrete theft. The *Igrot Moshe* shows that a competitive situation defines such an ill-gained grade/status as actual stealing. This of course applies even more so to professional sports, in which the monetary value of performance is even more tightly connected to rule-breaking (making that extra yard, that final stroke).

And so, on the legal-contract level, as long as the rules of the game do not permit use of performance-enhancing pharmaceuticals, it is simply forbidden halachically. Such use is an act of theft.

<sup>10</sup> For a review see Charles E. Yesalis ; *Anabolic Steroids in Sport and Exercise* ; Pub. Human Kinetics, 2000

<sup>11</sup> Talmud Bavli, Tractate Chullin 94a

<sup>12</sup> Rashi *Chullin* .94a, s.v *Mishum* . see Bamidbar 35:33 (“Do not indict the land in which you reside”) and the Midrash on this verse: *Sifri Bamidbar* no. 161 (“This is a warning for flatterers”)

<sup>13</sup> *Chullin* 94b. See next note on self-deception.

<sup>14</sup> *Shulchan Aruch, Choshen Mishpat* .228:6: “One should not give the impression that one is doing something for another, when he really isn't. For example: He should not urge his friend to eat with him when he knows that the person won't [accept his invitation]. He should not send gifts when he knows the person won't take them. He should not open a fresh barrel of wine, the remainder of which

has been sold to a merchant, unless he informs his friend that it wasn't opened specifically for him. **But if it is the kind of thing the friend should have realized, and he is fooling himself** by thinking that it was done to honor him – for example, when a person meets his friend on the street, and the friend – thought he had come specially to greet him. [it is not necessary to inform him otherwise]”

<sup>15</sup> *Igrot Moshe, Choshen Mishpat* chap. 32

This banning of *gneivat da'at* notwithstanding, one must not assume that this resolves the question of halacha's relation to steroid use:

One should not refrain from the wider picture entailed here; enhanced performance can come in different shapes and forms,<sup>16</sup> with loopholes abounding<sup>17</sup>. Is a substance undetectable by standard screening still prohibited? If so, and the harsh restrictions may include any or all substance use - what would be the borderline between a normal "blood sweat & tears" training regimen and the illegal one? More generally, we are fast approaching the point where answers are needed for the more fundamental question of *enhancement* versus *health*<sup>18</sup> in more areas than just professional sports.

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The question remains complex: while halacha does prohibit this kind of "theft", it is the rules of the game that determine what constitute an infringement on lawful gains, thereby making it an actual theft (according to Rabbi Feinstein). As we know, this is not as simple as saying "well, that's just wrong" about a particular form of substance abuse, since the athletes are pushed way beyond the realm of normal human capabilities<sup>19</sup> to begin with, even before the issue of enhanced ability presents itself. Determining the specific limitation on performance enhancement is no longer only in the realm of common-sense.

<sup>16</sup> Genetic enhancement is not a topic for sci-fi stories anymore. So is cybernetic enhancement of almost every human faculty. Medical technology used to improve the lives of severe paraplegics can be used to improve synapse reaction time and accuracy, strength etc.

<sup>17</sup> Breathing doctored gases to improve blood oxygenation, and confining oneself to a pressure-tank seems very artificial and "wrong", but is it worse than traveling to mountainous regions in Africa for month to achieve similar results?

<sup>18</sup> See Caplan A, Elliott C (2004); *Is it ethical to use enhancement technologies to make us better than well?*; PLoS Med 1(3): e52.

<sup>19</sup> There are other instances of biological changes that occur in professional sport, like the acute hormonal and physiological effects on female athletes. These changes (including issues of medical endangerment and gender identity) are mainly due to the athletic regimen, whereas we are concerned here with pharmaceutically induced changes.

## 2. V'nishmartem L'nafshoteichem and Shomer peta'im Hashem

**"You shall be very careful of yourselves since you did not see any image on the day the ETERNAL spoke to you at Chorev from within the fire"<sup>20</sup>**

The *nefesh* ("yourselves") constitutes the actual human existence – animal and spiritual, traditionally without a sharp distinction between spirit and body. Taking care "not to harm it", is the maxim of not harming ones body or psyche.

One must keep safe, but it is also clear that this is not as simple as it sounds in the regular course of life. For that reason, wages of work are de-facto described in terms of the very lifeblood ("*damim*"<sup>21</sup>) of the worker. Hence, responsibility of the employer for the employee is far greater than merely monetary, as the Talmud states:

**"And he setteth<sup>22</sup> his soul upon it"<sup>23</sup>: why did this man [the labourer] ascend the ladder, suspend himself from the tree, and risk death itself; was it not that you should pay<sup>24</sup> him his wages?<sup>25</sup>**

Simply put - People put themselves at risk every day just to make ends meet. That is a given situation, and they are not to blame for the risks they take. This passage is not a criticism about the way people provide for their families, but rather an appreciation for the inherent danger of regular livelihood. Of course, loose risk-taking is not commended halachically. There is a gradation to the level of acceptable risk in different professions. The gemara<sup>26</sup> keeps some instances of (medical) self-endangerment as permissible, based on the verse *Shomer peta'im Hashem*<sup>27</sup> (God protects the simple).

<sup>20</sup> Dvarim 4,15; Translation - *The Torah* (Feldheim, 1999).

<sup>21</sup> This word relates both to monetary value, payment, and the original "Dam" – blood.

<sup>22</sup> Lit., 'lifteth up.'

<sup>23</sup> Dvarim 24,15.

<sup>24</sup> Rashi: So that for withholding it one is punished as for taking life.

<sup>25</sup> Baba Metzia 112a

<sup>26</sup> Talmud Bavli tractate *Shabbat* 129b.

<sup>27</sup> Tehillim 116:6.

See above, page 19, note 44 in this issue.

-editor

This leniency applies to risks that many people are willing to take for their financial livelihood. An important *psak* regarding personal danger in a profession is discussed by the *Noda B'Yehuda*:

How can a Jewish individual enter into a place full of wild animals? Even though the Torah allows a poor individual to do this for his livelihood – similar to those who travel the high seas to sell their wares – what they do is for their livelihood and they have no other option and the Torah states “and for these he puts his life” to which our rabbis comment “Why did he walk up a ramp or hang from a tree and put his life on the line? Was it not for his wages?”.

But regarding someone who enters into a place of wild animals and places himself in danger and his main intention is not for livelihood but rather because of desires of the heart, he violates the dictum “You shall be very careful of yourselves”.<sup>28</sup>

The *Noda B'Yhuda* classifies livelihood as an acceptable risk through the same logic that guides gemara in the verse. Some activities that involve active danger are halachically taken as natural<sup>29</sup>, a given risk to which people subject themselves as a matter of course. Professional sport is a very demanding vocation that is very heavily financial. It is a career for the athletes and an entire industry surrounding them. There is also a prominent element of "desires of the heart", the fame and glory of an accomplished champion. It is hard to discern how the ruling of the *Noda B'Yhuda* applies here. We will therefore use another halachic analysis of risk-taking, focused on the concept of *Shomer P'taim Hashem*.<sup>30</sup>

<sup>28</sup> R. Landau, *Noda B'Yehuda*, Yoreh De'ah chap. 10.

<sup>29</sup> Making These cases the guideline for the type of permissible occupations: שם-אריה י"ד ס' כז; שבט-מיהודה ח"א א, ט; חלקת-יעקב ח"ב ס' יב; שמירת שבת כהלכתה לב, א, הע' ב

<sup>30</sup> Psalms 116,6. See Talmud Bavli Tractate Shabbat 129b, Tractate Yebamot 72b, 100b, Sanhedrin 110b.

There are several understandings of the level of danger that is covered by the *Shomer P'taim* clause for permissible action: extremely remote possibilities for danger<sup>31</sup>, normally safe situations<sup>32</sup>; dangers that are not inherent to the given situation<sup>33</sup>; or a strict limitation to very specific issues<sup>34</sup>. Rabbi Shlomo Cohen-Duras<sup>35</sup> reviews these halachic rulings regarding risks, with regard to professional sports.

Rabbi Hershel Schachter in his responsa<sup>36</sup> differentiates three levels of risk in undertaking a profession:

a) Activities that are clearly dangerous without redeeming merit (“Russian roulette” type activities); these activities are prohibited outright.

b) Some activities are not viewed as dangerous although there may be the possibility of danger in the course of action; these are permitted and do not involve the principle of *Shomer peta'im Hashem*.

c) There are activities, which some view as dangerous and others do not; *Shomer peta'im Hashem* applies in those cases.

I make use of Rabbi Schachter's halachic gradation of risk in the sports-steroids case, since it is more coherent and comprehensive than previous halachic evaluations of *shomer p'taim*.

The partitioning of risk levels into areas requiring deliberation and clear guidelines is important in disputed cases such as the case of steroids. It clarifies the halachic issues.

<sup>31</sup> Ezrat Cohen , 37.

<sup>32</sup> קובץ-שעורים , הרב אלחנן וסרמן כתובות פ"ג אות קלו  
<sup>33</sup> צפנת-פענח בראשית בעריכת הרב כשר, פרקי מבוא עמ' 49

<sup>34</sup> אגרות-משה אה"ע ח"ד עגא - אגרות-משה

<sup>35</sup> Discussion of hazardous sporting activities ; Techumin 22:120-126.

<sup>36</sup> *B'Ikvei HaTzon* , no. 34. Contrary to Rabbi Cohen-Duras (Supra), in my opinion the concept "Shomer P'taim" (especially the use Rabbi Schachter make of it) must not be confused with the deliberations of some Responsa on the subject of smoking, where the same principle was invoked in "favor" of smokers. The overwhelming evidence of clear mortal danger in smoking has prompted the highest Rabbinic authorities to forbid smoking in recent years (Even though some past responsa did not forbid smoking completely). The danger as known at the time is the important issue halachically, and Rabbi Schachter aims at a halachic rule for determining where it applies. Today smoking clearly falls under section a - prohibited.

The question of steroid use is a formal-halachic problem of risk-taking. Even if steroid use were legalized, no longer posing a legal issue - would it still be halachically problematic<sup>37</sup>? Where would the health risks coming from use of such drugs, place the use of steroids in the levels of risk-taking that Rabbi Schachter lays out?

Where can one who would oppose steroid-use on grounds of unnecessary risk-taking, draw the line<sup>38</sup> of acceptable risk in professional pursuits?

The current debate surrounding the issue of steroid use would point, according to healthcare authorities<sup>39</sup>, toward the third level of risk in R. Schachter's responsum. Nevertheless, medical ramifications of steroid use in adults still do not account for the over-all risk in steroid use by adolescents<sup>40</sup> aspiring to a professional athletic career through steroids, or emulating professional athletes.

The clear and direct danger to an undeveloped body is far greater than to an adult. These include heart and liver damage, infections, changes in sexual characteristics, violent rages, and even severe depression that can lead to suicide<sup>41</sup>. The growing percentage of adolescent steroid use in the United States, makes the risk type much closer to the first kind in R. Schachter's gradation, and therefore not a permissible risk to be taken.<sup>42</sup>

***The risk level of steroid use by professional athletes may be considered as belonging to a halachic "grey-area"***

## **To sum up, in Rabbi Schachter's terms:**

Current conflict on the subject, suggests that the risk level of steroid use by professional athletes may be considered as belonging to a halachic "grey-area" (section c above). But it is quite possible that research and investigation into the matter (both for adult and adolescent steroid use) will tip the weight of the matter to the definite danger level described by R. Schachter (section a).

## **II. Halachic perspective on special prostheses**

The case prompting the following survey of special prostheses and their place in halacha, is the recent case of Oscar Pistorius. Oscar Pistorius, the South-African Olympic runner, is a double-amputee. His prosthetic limbs<sup>43</sup> enable him to compete in the regular Olympics. His achievements in exceptional running times evoked concerns regarding the fairness of allowing someone with enhanced capabilities to compete with healthy<sup>44</sup> athletes.

This new medical-technological field of technologically enhanced human ability has important ramifications on sports as well as on society in general. Evaluating the halachic status of special prostheses requires a return to the basic aspects of prostheses - both classic and new - in halacha. After this basic analysis, we will see the ramifications of formal-halachic considerations on the present problem in professional sports.

### **Classic Prostheses in Halacha**

Regular limb prosthetics are a known halachic subject since ancient times<sup>45</sup>, as were artificial permanent teeth<sup>46</sup>. The discussion varies in topic, for example:

<sup>43</sup> Composed of carbon-fiber, and popularly called the "Cheetah Flex-Foot" for their stream-lined shape.

<sup>44</sup> One might even feel concern regarding the possibility of self-inflicted harm for the purpose of athletic achievement. This is not as far-fetched as it would initially seem (as we see in the beginning of the article regarding David's men).

<sup>45</sup> "מקל" - טושו"ע אר"ה שא יז. ובלשון המקרא 'מחזיק בפלך' (רש"י שמו"ב ג כט); "סמוכות" במילוי צמר גפן - שבת סה ב. וראה תוס' שם ד"ה הקיטע; שבת סו א. רש"י שם ד"ה ואם; "כיסא של קיטע" - שבת שם, וברש"י שם ד"ה סמוכות.

<sup>37</sup> As is the general case with dangerous sports – see

<sup>38</sup> R. Ovadia Yosef in his response *Yabia Omer* 3:7, limits the use of "Shomer peta'im Hashem" to cases with a **positive religious need** (*Dvar Mizva*). His qualification does not deal with livelihood and direct physical harm from activities, but with traditionally accepted "dangers" that many people do not perceive today, such as eating fish together with milk.

<sup>39</sup> See the different depictions of the same medical dangers: Hugo Rivera The Myths and Dangers of Anabolic Steroid Usage <About.com> retrieved 01/20/2009. also: Anabolic Steroids, A Dangerous And Illegal Way To Seek Athletic Dominance And Better Appearance; USA Drug Enforcement Administration, March 2004.

<sup>40</sup> Susan Jay, MD; Steroid Use: The "Body Beautiful" Through Chemistry ; Journal Watch Pediatrics and Adolescent Medicine May 13, 2002

<sup>41</sup> Bahrke, Michael et al ; Risk Factors Associated With Anabolic-Androgenic Steroid Use Among Adolescents ; Sports Medicine. 29(6):397-405, 2000.

<sup>42</sup> The issue is also wider than personal risk – the public risk is regarded more sternly in halacha, so that the risk factor would climb if only because of the spreading of the risk.

- a. The possibility of moving with them on Shabbat, specifically the issue of level of dependency on the prosthetic limbs and to what extent they are considered inseparable from the person using them<sup>47</sup>.
- b. Issues of Laws of Purity are considered: Are the prosthetics tools or garments, with regard to impurity (*Tum'a*)<sup>48</sup>; are prosthetics a problem (*chatsitsa*) when worn during ritual bathing (*Tvila*)<sup>49</sup>?
- c. The status of a paraplegic Cohen, normally banned from work in the Temple or Birkat Cohanim in the synagogue, is deliberated<sup>50</sup> in case of a prosthetic leg.

Technological advancements in composite materials, computation and bio-engineering have produced a myriad of new prosthetic solutions for the disabled. Some of these solutions rely heavily on technological systems that are constantly evolving<sup>51</sup>. Let us examine some examples of the new generation of special prostheses and their halachic status:

## 1. Hearing:

The use of artificial sense aids – namely hearing aids, has also received ample discussion in the responsa of the past decades, by the great poskim of the previous and present generation.

Technological evolution brings the hearing aid closer to what is today referred to as "special

prostheses". Renewed discussion on the issue of hearing aid followed the introduction of the cochlear implant (CI) sometimes described as a bionic ear. What sets this hearing aid apart from previous technologies is that it bypasses the damaged auditory organs in the ear. Cochlear implants do not amplify sound, but work by directly stimulating any functioning auditory nerves inside the cochlea by an induced electric field. The halachic debate is whether to see the cochlear implant as an expanded version of the previously known hearing aid<sup>52</sup>, or to treat this kind of technology on a different basis from the old hearing aids<sup>53</sup>, where the main consideration was internal functionality of an external machine, namely electricity. According to the latter view, this is not an external microphone but a supplementary ear or hearing faculty altogether<sup>54</sup>. The cochlear implants are not the cutting edge of hearing implants. New developments<sup>55</sup> enable direct access to the auditory nerve thereby replacing the entire ear (external and internal)<sup>56</sup>. Perhaps this kind of implant will be considered as fully replacing the ear and not just supplementing it with enhanced volume.

## 2. Eyesight

Innovation in neuro-logical science enables completely blind people to see even with physiologically damaged ocular faculties<sup>57</sup>. This is possible through direct stimulus of the visual centers in the brain<sup>58</sup>, or an electronic replacement of the retina.<sup>59</sup>

<sup>46</sup> שבת סד ב, וברש"י שם ד"ה שן, ששיניים תותבות היו מוכרות כבר בזמן התלמוד, והיו עשויות מזהב.

<sup>47</sup> לגבי מקל של חיגר: טוש"ע או"ח שא יז; שמירת שבת כהלכתה, פ"ח סי"ג.

לגבי קיטע ורגל תותבת: שו"ת בנימין זאב, ח"ב סי' רח; שו"ת אגרות משה, האו"ח ח"ד סי' צג; ילקוט יוסף, שבת, כרך ד סי' שכח ספ"ט. וראה בס' שולחן שלמה ח"א סי' שא סקי"א(א); שמירת שבת כהלכתה, פ"ח סט"ו. למרות שבשו"ע או"ח סי' שא סע' טו נפסק לאיסור, הדין שונה בתותבות שבימינו.

<sup>48</sup> שבת סו א; רמב"ם כלים כה יט.

<sup>49</sup> עין מלאכותית: שו"ת מהרי"א אסאד חיו"ד סי' רכט; שו"ת שואל ומשיב מהדו"ת ח"ג סוסי' קח; יד שאול יו"ד סי' קצח; שו"ת כוכב מיעקב סי' קלא; שו"ת הר צבי חיו"ד סי' קסא; שו"ת אגרות משה חיו"ד ח"א סי' קד; שו"ת מנחת יצחק ח"ג סי' כב; שו"ת באר משה ח"ב סי' נו; שערי טבילה סי' לט;

שינים תותבות – רוב הפוסקים מקילים בתותבות קבועות: שו"ת מהרי"א אסאד חיו"ד סי' רכט; דרכי תשובה יו"ד סי' קצח סקע"ה; טהרת ישראל סי' קצח ספ"ז; שו"ת בנין ציון החדשות סי' נו; חכמת אדם כלל קיט, בבינת אדם שער הנשים אות יב. האבני נזר (חיו"ד סי' רנט) מחמיר אם רוב התותבות הפכו לקבועות, וחולק עליו בשו"ת אמרי יושר ח"ב סי' קצג.

<sup>50</sup> שו"ת אגרות משה, האו"ח ח"ב סי' לב

<sup>51</sup> These systems are also developed for the general consumer-market, and are becoming household brands, see for example: <<http://www.thinkartificial.org/artificial-intelligence/whole-body-computer-interfaces/>>

<sup>52</sup> In the sense that it does not heal an organ or returns functionality to it, thereby becoming a healing of a mal-condition. This view is that the cochlear implant is an external machine aiding the person. See R. Gavriel Toledano, in an answer in the IRP database, and a subsequent article in Assia 82-83.

<sup>53</sup> ד"ר ישראל ברמה; שתל הקוכלארי והגדרת החרש בהלכה; תחומין כרך כד עמ' 173.

<sup>54</sup> The main argument for this position is the bypassing of the damaged receptors in the ear.

<sup>55</sup> John Middlebrooks, Russell Snyder; *Enhanced Hearing Replacement Using a Penetrating Auditory Nerve Array*; The Journal of the Association for Research in Otolaryngology (JARO); January 30, 2007

<sup>56</sup> See *Science Central Report*, 07.26.07.

<sup>57</sup> See 'Bionic' eye gives blind people some sight; *The Guardian*, Tuesday April 22 2008

<sup>58</sup> Detailed examples and sources available at <http://www.artificialvision.com/> This is actually achieved with by extracting shape information from visual to-auditory sensory

The halachic ramifications of this artificial sensory replacement has recently been explored<sup>60</sup>, touching subjects like the function of a judge, a Cohen, reliance on observed phenomena and the performing mitzvot in general.

### 3. Bio-Mechanical prostheses, Body-Computer Interface (BCI)<sup>61</sup>

Research in neurology and computing has produced a bio-mechanical interface<sup>62</sup> between machine and the human body and brain. This allowed manipulation of robotic limbs directly through the brain<sup>63</sup>, as in regular limb movement. Body-Computer Interface and Brain-Computer interface (BCI) technologies have recently been discussed halachically. The preliminary discussion<sup>64</sup> lays out the wide halachic scope - covering ritual and legal performance, responsibility for actions etc.

More focused attention is given<sup>65</sup> to a specific topic – the use of body-computer interface on Shabbat.

*New developments enable direct access to the auditory nerve thereby replacing the entire ear (external and internal)*

### 4. Expansion of the human body

Both the BCI and the bionic-eye discussions make a point of the merging between man and machine to the point of inseparability. The issue of a machine becoming a part of the person to which it is connected has been brought up in the case of a pacemaker and its reuse after death<sup>66</sup>.

For example, the degree of the prosthesis (or its components) merging with the body plays a central role in the considerations for and against its use on Shabbat<sup>67</sup>. So the connection between the body and the machine has direct halachic ramifications, making the use of the artificial limb or organ a human action, and its integrity is as important as the body's own health and dignity.

We must qualify this halachic regard for the special prosthesis and its role as an expansion of the body, with a limitation on the topics: halacha does not decide whether use of a special prostheses is illegal in a competition: that is up to the rule-makers of the sport.

Halacha can treat a prosthesis as an integral part of the body, but that would not define the legitimacy to compete in sport at a specific competition class. For example, a halachic analysis may conclude that a paraplegic Cohen equipped with bio-mechanical limbs that function smoothly with his body, can perform the technical sacrificial duties; even if such a ruling would be made, it would not reflect on the legality of his participation in a marathon.

### To sum up:

Competitive sport has an autonomous legal structure that halacha does not breach unless it is a matter of clear mortal danger, in which case even other halachic considerations are superseded. That aspect of the discussion was addressed in the section dedicated to steroid use.

substitution. See A. Amedi, et al; *Shape conveyed by visual-to-auditory sensory substitution activates the lateral occipital complex* ; *Nature Neuroscience*, Vol. 10, No. 6, pp. 687 - 689, June 2007 (doi:10.1038/nn1912).

This research was also featured in the New Scientist print edition of May 26, 2007, with an article titled "How the brain can hear shapes", p. 22.

<sup>59</sup> See Gislin; *Virtual technologies aid in restoring sight to the blind*; *Communications Through Virtual Technology: Identity Community and Technology in the Internet Age* Ed. G. Riva & F. Davide, IOS Press: Amsterdam, 2001; Chap 15.

<sup>60</sup> שלומי רייסקין ; "עיניים חשמליות" – האם נחשבות כ'ראיה' ? ; תחומין כ"ו, הוצאת מכון צומת תשס"ו ; עמ' 419-426.

<sup>61</sup> Not to be confused with Brain-Computer Interface that can help in treating damaged brains. For example: *Electronic chip, interacting with the brain, modifies pathways for controlling movement* ; *University of Washington*; Public release date: 24-Oct-2006. The wide range of applications is described in: <<http://thegoalmine.com>>.

<sup>62</sup> See: Gopal Santhanam et al; A high-performance brain-computer interface; *Nature* Vol. 442 13 July 2006

<sup>63</sup> See : Meel Velliste et al ; *Cortical control of a prosthetic arm for self-feeding* ; *Nature* Vol. 453 19 June 2008

<sup>64</sup> שלומי רייסקין; ממשקי מחשב-מוח (BCI); אסיא עט-פ, עמ' 5-16 (2007).

<sup>65</sup> ישראל בלפר; ממשקי אדם מכונה בשבת ; אסיר פג-פד, (2008), עמ' 67-90.

<sup>66</sup> הרב ד"ר פנחס טולידאנו, הוצאת קוצב לב מגופו של נפטר; תחומין י"ב, 385-388. נשמת אברהם יורה דעה סימן שמת, סעיף ג.

<sup>67</sup> רייסקין, שם, עמ' 417-418. בלפר, שם.