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Editorial

Illuminating Obstetrics and Gynecology via Google Glass: Its potential application

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A quantum leap that zooms the future into the present? Google X's major new technological advancement, Google Glass, certainly appears to be this and is today 'the talk of the town' among the general public but especially among professionals round the globe. Google Glass, or Project Glass, is an augmented reality device resembling a pair of glasses and fitted with a video camera lens perched just above the right eye of the wearer. The wearer communicates with the Internet through language commands thus enabling real time live - streaming of information, images and graphs transmitting what the user is seeing.

This Web - connected, wearable - technology computer promises to have invaluable applications in numerous fields, such as aviation, firefighting, law enforcement, but some of its most exciting new developments will be in the continuously evolving Healthcare Delivery System - and, very definitely, in surgical specialties, among these, of course, obstetrics and gynecology. Google Glass was first demonstrated in the USA in 2013 in the course of which a number of surgeons were instructed during the operation on how to utilize it in their practices. Though still in beta version and not yet officially released, a limited number of Google Glass devices are available and are being used in operations ever more frequently by general, plastic, orthopedic and cardiac surgeons. Very clearly, there is huge scope for its use in our own specialty too. There follows a brief overview of the multiple benefits of Google Glass for obstetrics and gynecology.

Perhaps the most important advantage of this high - tech tool is its ability to avoid or correct mistakes, in a word, to improve efficiency through enhancing vital decision - making. Thus, a gynecologist equipped with the Glass who comes up against an unforeseen situation in the operating theatre is able at any moment, via a specific voice command, to record and forward a video and audio message in real time to a more experienced colleague at a distance. Such interaction obviously augments the efficacy of intraoperative consultation, which in turn heightens surgical success. Likewise, in especially difficult cases, major intraoperative complications and risks in obstetrics and gynecology can be averted through accessing the help of doctors of other specialties (urologists, general surgeons) or more experienced obstetricians and gynecologists: it is important to note that Google Glass enables the user to live - stream information not only in real time but also with the utmost precision and accuracy. Up till the present, video transmission has been carried out by Skype or video conference call. Now, however, both the obstetrician and gynecologist and the viewer see the same perspective within the operating theatre/delivery suite thanks to the 'magic' of

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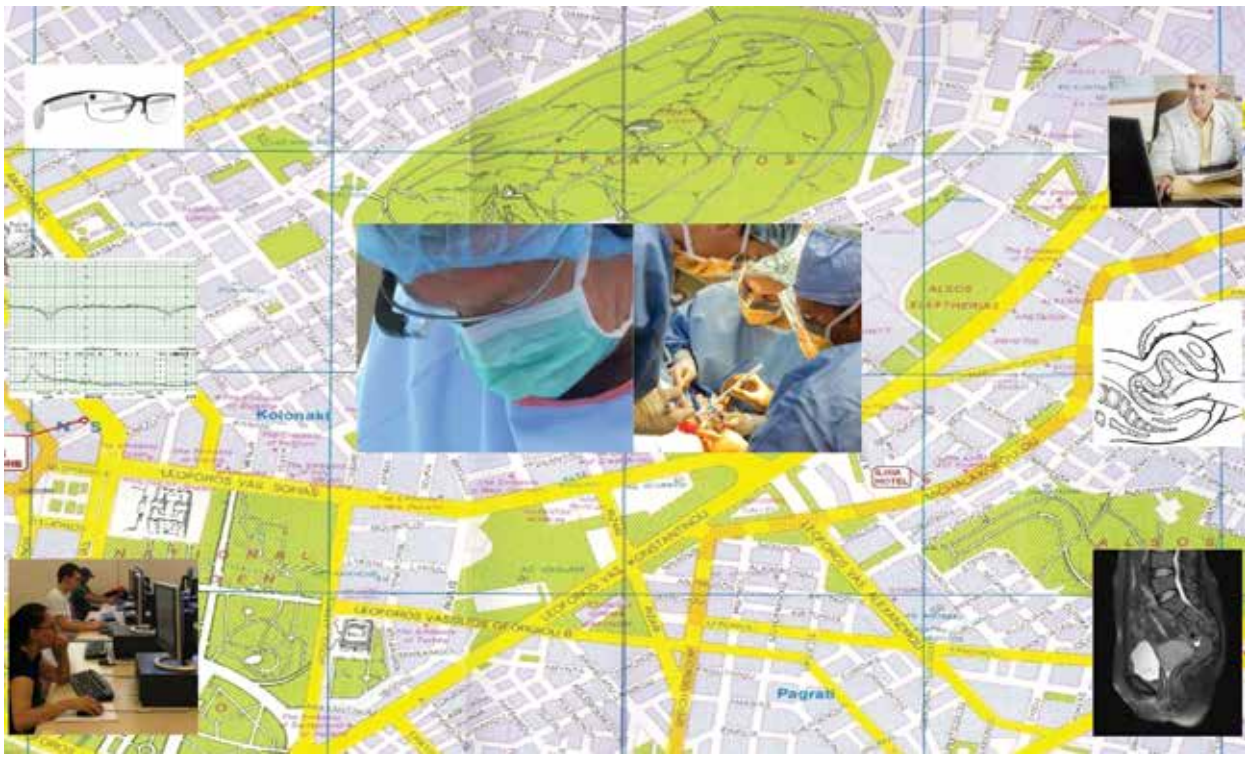

Figure. Google Glass enhances obstetric and gynecologic vision efficiency. The emerging use of Google Glass, by means of which technology, during an operation or delivery, an obstetric or gynecologic team can communicate visually and audibly with another expert/experts via the Internet. Medical students can observe an operation, delivery or cardiotocograph being performed in real time even thousands of miles away. MRIs, checklists, details from the patient's file and other reference material can be instantly accessed by the surgeon via Google Glass without the need to move away from the operating table. Google Glass is a historic breakthrough in Medicine; its further testing and evaluation, as well as resolution of privacy issues, are essential, but its eventual widespread application appears assured

the Google Glass wearable computer, leaving skyping and video conferencing for uses outside of the respective places. By means of the Glass, the connected practitioner can see an operation or a cardiotocograph through the operator's eyes while vitally interacting with the obstetrician and gynecologist.

An additional way in which Google Glass devices will in the future enhance Medicine in general, but perhaps particularly the fields of obstetrics and gynecology, will be through its use as an educational tool. The great benefit is that medical students and residents may watch an operation without needing to actually be in the operating room, crowded together peering over the surgeon's shoulder, thus both surgical and procedural training will be greatly enhanced. This is especially true of obstetric cases where the attending staff in the room is numerous, making meaningful observation by trainees problematic.

One other huge educational, but also archival/documental, advantage is that Google Glass enables the recording of a difficult or rare procedure in obstetrics and gynecology, which can subsequently be used for training purposes as well as for discussion between experts and residents.

Another interesting use of Google Glass is image integration. For example, when in obstetrics the dissection of an ovarian mass or a uterine myoma is

due to be carried out, the surgeon can preoperatively upload CT - scan and X - ray images into the Glass: then, without needing to leave the operating table or log onto another system, he can compare the images in real time fashion intraoperatively.

It is widely known that checklists are one of the most consistently valuable tools for preventing intraoperative mistakes and increasing the patient's safety. Google Glass will take care of this too, and there are already hands - free and voice - driven Google Glass sample checklist applications that can be used intraoperatively.

Moreover, thanks to the Glass, obstetric emergencies, which are not infrequent, will be far easier to handle given that the device can instantly call up the appropriate protocol treatment for a rare complication, relieving the practitioner of the effort and difficulty of trying to recall a specific algorithm in a state of emergency.

Google Glass may be employed as a patient toolkit, which is of immense importance for reduction of care fragmentation as well as optimal coordination among all care providers. In relation to the fields of obstetrics and gynecology, it could be used by the pregnant woman or gynecological consumer to maintain an electronically stored record by registering the intercommunications conducted between the various healthcare providers. This could be extremely useful in particular for obstetric patients who, more likely than not, will be treated by several doctors and midwives during the course of their pregnancy. Another use might be to record meetings between patient and obstetrician and gynecologist, such as the patient's preoperative visit(s) and the surgeon's appraisal of his patient as to potential surgical complications. In addition, post - surgery Google Glass apps could provide obstetric patients with post - discharge communication and appropriate recovery information, minimizing the necessity for re - examination.

Privacy violations must, of course, be stringently regulated. In all cases, informed consent needs to be obtained from patients to record any photos or video during the operation or register medical data via use of Google Glass. In obstetrics and gynecology, this issue is especially sensitive, since it is inevitable that the use of the device could well rouse negative reactions in a woman who, at a very special and emotional moment in her life as is the birth of a child, will be entirely justified in refusing it. Certainly, very strict safeguards will be indispensable.

Other lesser limitations of Google Glass are at present its short battery life and problems with Wi-Fi connectivity, while improvements will surely need to be made in obtaining sharper resolution and enhanced voice - recognition capability.

In summary, Google Glass wearable computer technology is a real revolution in healthcare, possessing as it does a huge array of potential options for application. Though there is still a long way to go until it is established in daily practice, the vista before us is a bright one.