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Masterarbeit

Autologous breast reconstructions in a private practice setting

vorgelegt von:

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1. Introduction

Breast cancer remains one of the most malignant diseases in the female population. An essential part of it also affects part of the female self-confidence, and therefore causes a wide range of psychological affections besides the known physical damage. The incidences vary between 70 and up to 100 new cases per 100'000 inhabitants per year. The risk of suffering from breast cancer in a lifetime in the female population is about 1 out of 9 women.[1] Besides the conservative treatment options, there are various kinds of mastectomy procedures. Women undergoing mastectomy for either oncological or prophylactic reasons are left with the choice of which type of breast reconstruction will be the most suitable for them. The two main branches are the implant based reconstructions and the autologous reconstructions. The currently most common method is the implant-based, since it is the technically simplest. It comes with a shorter operating and recovery time. Furthermore, it is localized in the same area, thus avoiding major surgical trauma, complications, and scars to other areas. Even if the placement of tissue expander due to insufficient local soft-tissue coverage of the implant is needed, it still remains a less invasive technique compared to the autologous reconstruction.

However it does come along with a host of potential immediate and delayed complications. In ipsilateral cases, the reconstructed breast will resist gravitational ptosis while the natural breast will descend with age. In addition, it is generally more difficult to achieve a natural looking result using implants. Furthermore, the patients have to live with a life-long risk of infection, capsular contracture and rupture of the implant, making a further operation necessary. An anticipated radiotherapy may be viewed as a relative contraindication. [2]

Breast reconstruction has evolved considerably. Since the first reported successful free vascularized tissue transfer in 1959 [3], many autologous techniques have been established in the reconstructive armamentarium. The diversity of techniques in autologous breast reconstruction, each one of them with its own indications, makes it possible and necessary to treat patients tailored to their individual needs and body habitus [4]. While the performance of these operations in big institutions has been well established, it is not yet common in a private practice setting. A recent meta-analysis suggests that autologous abdominal tissue reconstruction has a lower risk of reconstructive failure and surgical site infection when compared with tissue expander/implant reconstruction, but it still does have a higher risk for skin or flap necrosis [5]. Due to the concern of flap loss and other complications, the patients are usually monitored in an ICU for several days. The autologous reconstruction techniques are difficult and do come with longer operation time and the need for microsurgical abilities in the operating team. Altogether, this makes autologous techniques more complicated and elaborate, which may be the reasons why these techniques are not widely embraced in a private practice setting yet.
Some articles demonstrate the possibility of a safe and efficient use in these settings [6-8]. Elliot suggests that the muscle-sparing free TRAM flap, performed by a team familiar with the procedure, is a safe and effective technique achieving an acceptable average 3-hour operating time with minimal complications [6]. Hamza concludes that with a team experienced in microsurgery, a proper strategy, and good organization, the free TRAM flap finds an indication of choice in the arsenal of therapeutic possibilities in the private practice [7]. The results of Bonawitz SC's study demonstrate that high success rates can be achieved in any practice setting. It suggests that the most important factors in success in free tissue transfer are the experience of the surgeon, preoperative preparation and careful, accurate technique [8]. In this article, we want to review the management and approach of autologous breast reconstructions in X patients

performed in the “Klinik Pyramide am See” in Zurich. In addition to demonstrating the differences, such as the postoperative management, which does not require the patients to stay in the ICU, but is handled in a 48h monitoring in the bedrooms of the clinic.

2. Analysis

2.1 Methods

The data of 216 consecutive autologous reconstructions between 2010 and 2014 were collected and retrospectively reviewed. All of the procedures were performed by a single surgeon (J.F.) with a variable number of assistants (1-3) in a private practice setting. The main focus was on the operative management and the techniques that were used to perform these operations. Furthermore, the number of patients, the distribution of the techniques used, the age distribution of the patients, and the length of hospital stay in days were taken into account. An important point was to show that the techniques are being successfully performed in a private practice setting and comparing it to the management in clinical hospitals.

2.2 Patients

All patients who have undergone a unilateral or bilateral autologous breast reconstruction between 2010 and 2014, performed by the same surgeon, have been identified and the data has been collected. The age of the patients ranged from 33 to 74 years with an average age of 52,2 years to date of the procedure. The inclusion criterium was autologous breast reconstruction. There were no exclusion criteria, since the point of this review is to generally visualize the management of autologous breast reconstructions for all patients in a private practice and not a specific group.

2.3 Techniques

As there is a variety of techniques available, each operation was performed using the technique which was the most suitable to the patients needs and body habitus. Seven different techniques were used, most of which were free flaps such as the muscle-sparing transverse rectus myocutaneous (MS-TRAM) flap, the deep inferior epigastric perforator (DIEP) flap, the superior gluteal artery perforator (S-GAP) flap, the transverse myocutaneous/upper gracilis (TMG/TUG) flap, and the profunda artery perforator (PAP) flap. The remaining one was the latissimus dorsi (LD) pedicled flap.

Historically, the first method used to reconstruct the breast after amputation reaches back to the 19th century. In 1897 Iginio Tansini, an italian surgeon, was the first described that used the Latissimus Dorsi muscle to cover the defects that resulted after the amputation. [9] About 80 years later, in 1977, Muhlbauer and Olbrisch introduced the Latissimus dorsi myocutaneous flap for breast reconstruction surgery. [10] The LD flap bases on the triangular-shaped latissimus dorsi muscle and includes its fat tissue and the skin. It is based on to vascular supply systems. On one hand the thoracodorsal vessels, which branch from the subscapular vessels distal to the circumflex scapular vessels, on the other hand the myocutaneous perforators which branch from the intercostal and lumbar vessels supply the flap. While the LD flap is also described as a free flap, it is mostly used as a pedicled flap. In addition to the common complications of breast reconstruction, the LD flap procedure leads to deficits in extension and adduction due to the loss of the latissimus dorsi muscle in the back. [1] Due to the constant development of new techniques and evolving of consistent techniques to be more efficient, nowadays, the popularity

of the LD flap has waxed and waned. It is used with special indications, or due to contraindications for other flaps. [2]

Since its first description in 1979 by Holström, the free transverse rectus myocutaneous (TRAM) was the gold standard in autologous breast reconstruction for a long time. [11] The flap bases on a skin island from the abdomen of the patient that is resected between the umbilicus, pubic region and from the front of the iliac bone. The blood supply of the skin and fat tissue is assured by perforators through the rectus abdominis muscle, which is supplied by the deep inferior epigastric vessels and the deep superior epigastric vessels. The TRAM flap can be performed in a pedicled as well as in a free microvascular form. As a free flap, it is harvested with a cuff of the rectus abdominis muscle. On the recipient site, the flap is usually reanastomosed with the thoracodorsal or internal thoracic vessels. [1] Due to the damage of the rectus abdominis muscle after harvesting, this technique comes with a major donor site morbidity. To minimize the trauma to the fascia and the muscle, new techniques have been developed, sustaining an adequate blood supply to the flap. In 1989, Koshima and Soeda first described the harvesting of the lower abdominal flap without sacrificing the rectus muscle, and in 1991, Allen and Treece successfully performed the first DIEP flap for breast reconstruction. The MS-TRAM and the DIEP flap were developed and started to gain importance. [12] The abdominal tissue proved to be a reliable source of tissue due to its rich supply of volume and good quality soft-tissue. Suitable patients for this procedure have moderate amounts of abdominal skin laxity and fat, as well as a minimal to moderate volume requirement for breast reconstruction. Compared to the conventional TRAM, these new techniques cause less interference to the rectus abdominis muscle, have a more aesthetic inset of the transferred tissue. and come with a better blood supply in the transferred tissue. Both flaps utilize the same lower abdominal donor site and are based on the blood supply of the lower abdominal wall. The difference lies in the fact that the DIEP avoids the harvest of any rectus muscle or fascia, because the muscle is dissected to gain access to the main vascular pedicle. Sparing more muscle and fascia minimizes the risk of abdominal morbidity such as bulging or hernia, however, this makes the operation even more technically demanding. [13] However, because of the diminished abdominal wall, these flaps are not suitable for women who are considering to give birth. [1]

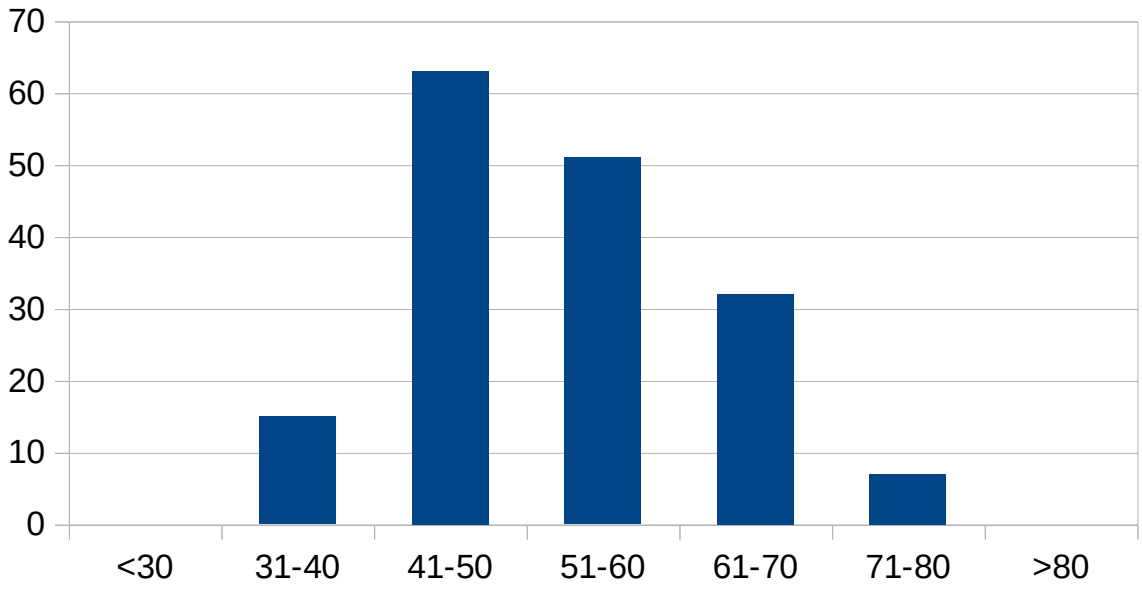
In patients with insufficient abdominal tissue or who have undergone significant previous abdominal surgery, alternative donor sites are needed. A technique, first described in 1975 by Fujino et al., refined and extensively modified by Allen et al. named the SGAP flap as a valuable option, which is to harvest from the upper buttocks region while using the superior gluteal vessels arising from the posterior division. [14] The flap extends from the trochanter major of the femur to the posterior superior iliac spine. Gluteal tissues are a solid second choice next to abdominal-based tissue reconstructions. Patients without sufficient abdominal tissue or previous abdominal surgery are often well-suited for gluteal reconstruction. It often includes patients that are undergoing bilateral reconstructions who have insufficient amounts of abdominal tissue for both reconstructions. The advantages are a faster recovery, no risk of abdominal hernias or bulges, a good projection of the reconstruction, and less postoperative discomfort. [2] In addition, the SGAP has a more favorable donor-site scar, which can be hidden within the bikini line and is designed similarly to a buttock lift. However, there are some disadvantages as there is a shorter pedicle length, less consistent vessel caliber and higher rates of vascular complications. [13] A review of Yaghoubian A and Brian BJ concluded that the

SGAP should be considered as a first choice more often and not only as an alternative should a DIEP fail or be unfeasible.[15]

Other valuable secondary donor sites are the upper inner thigh skin and fat. The TUG harvests the skin and fat in a horizontally oriented eclipse along the medial thigh. The medial circumflex artery and venae commitantes are used to reliably perfuse a sizable flap with the associated underlying fat and a small portion of the gracilis muscle. Initially described by Yusif et al in 1992, this procedure has evolved into a valuable alternative to the abdominal techniques, resulting in comparable complication rates as the abdominal techniques. [16] It is well-suited for patients with a minimal abdominal laxity and small to medium sized breast reconstructions. [14] The PAP flap is based on perforators of the profunda femoris that enter the posterior compartment of the thigh. The advantages compared to the TUG are an increased pedicle length and the avoidance of inguinal lymphatic disruption. [14]

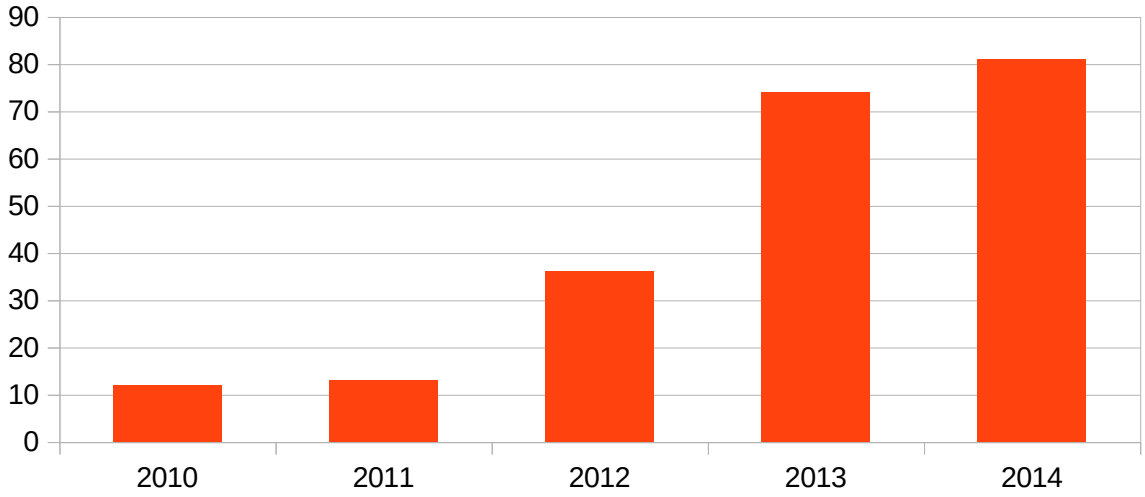
2.4 Results

Between 2010 and 2014, 177 patients had an autologous breast reconstruction performed by the same surgeon in the private practice “Pyramide am See”. Among these 177 patients, 216 autologous reconstructions were performed, out of which 138 patients underwent a unilateral reconstruction and 39 patients had a bilateral breast reconstruction.



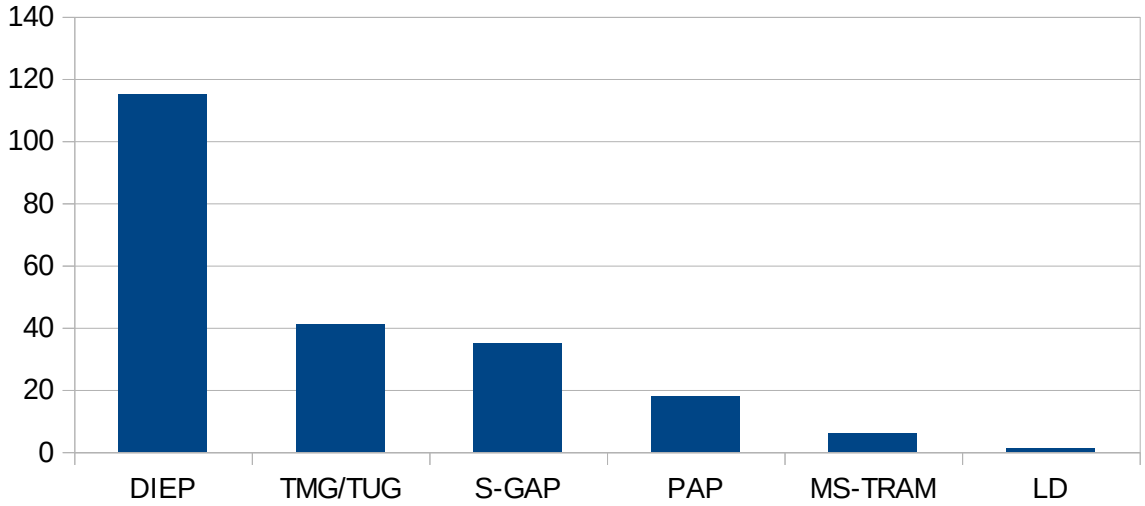
Graphic 1: Age distribution

The age distribution is visualized in the graphic above. While there are no patients under the age of 30 and only a few between 31 and 40, the peak is at the age group of 41-50 years. 63 patients belong to this group. The numbers start decreasing at age group of 51-60, which still remain the second largest. The number decreases further after the age of 60-70, reaching the lowest number in age group of 71-80, counting 7 patients. This distribution epidemiologically correlates to the age at diagnosis of breast cancer and therefore with the patients age at mastectomy and breast reconstruction. [17]



Graphic 2: Number of reconstructions per year

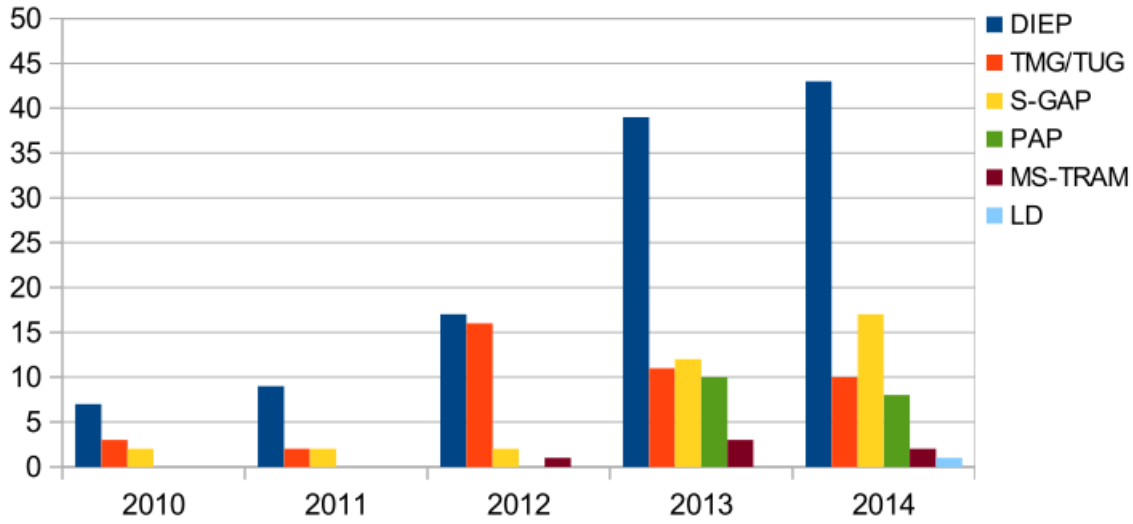
The graphic above shows the number of reconstructions per year. Within those 5 years in which the data was taken into account, it was possible to observe an increase of reconstructions per year. As per 2010, there were 12 and in 2012, there were 13 autologous reconstructions performed, and in 2012, the number had already increased to 36 autologous reconstructions. The number progressed in 2013 to 74 and, ultimately in 2014, it reached 81 autologous breast reconstructions.



Graphic 3: Distribution of the techniques used throughout the 5 years

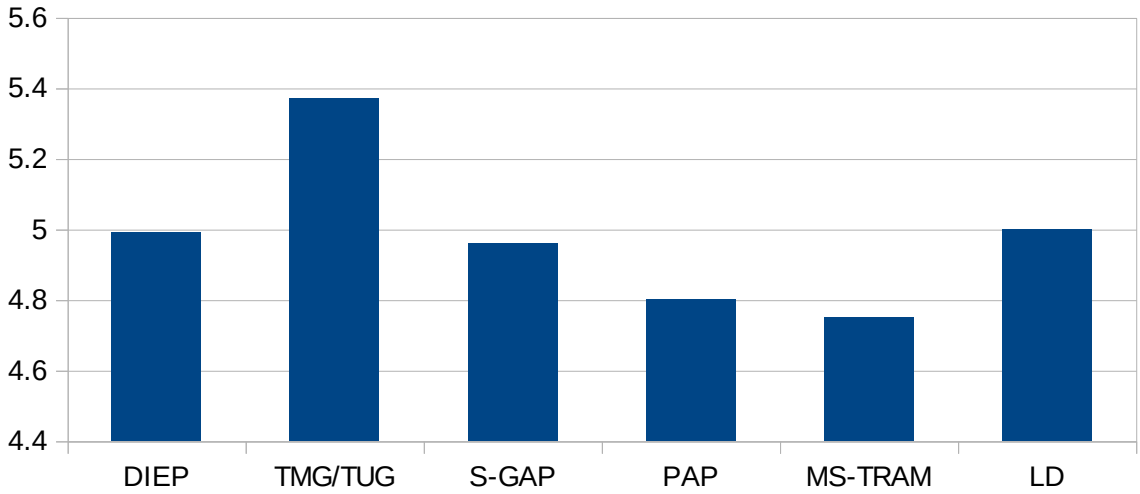
The graphic above shows the distribution of the techniques used throughout the 5 years. There is a clear tendency towards the DIEP flap. It was the most frequently used technique, as out of 216 reconstructions, 115 have been performed using the deep inferior epigastric perforator flap. The number increased threefold compared to the second most frequent technique. The DIEP flap is

followed by two techniques that were almost used as frequently. The TMG/TUG was used in 41 reconstructions and the S-GAP was suitable for 35 procedures. The PAP was performed only 18 times. Last but not least, there is the MS-TRAM, which was used in 6 reconstructions and the LD that was performed only once. Expressed as a percentage rounded to two decimal figures, the DIEP was used in 53,24%, the TMG in 18,98%, the S-GAP in 16.2%, the PAP in 8,33%, the MS-TRAM in 2,78% and the LD in 0,46% of the procedures. Analyzing this graphic, one has to take into account that this is the total number of the 5 years. The following graphic should illustrate the distribution of the techniques per year, for the evaluation of possible changes in the use of the techniques over the time that data was assessed.



Graphic 4: Distribution of the techniques used per year

After studying the distribution of the techniques used over the years 2010 until 2014, there were a couple of interesting observations to be made. Over the years the DIEP flap clearly seemed to be the best suited choice for the patients' habitus and wishes. Only in 2012, the TMG/TUG flap was almost used as often as the DIEP flap. However after 2012, the use of the TMG/TUG flap decreased down to the third most frequent. In contrast to the TMG/TUG flap, the S-GAP flap began to be used more frequently after 2012. By the end of 2014, it was the second most commonly performed procedure after the DIEP flap.



Graphic 5: Length of the hospital stay in days

Another important point was to evaluate the length of the hospital stay in days. The graphic above shows the average length of hospitalisation in days, rounded to two decimal figures and broken down by reconstruction type that was used to perform the operation. The figures of all average values are in a relatively small extent, ranging from 5.37 days in reconstructions using the TMG/TUG technique to the shortest hospital stay that was observed in the reconstructions using the MS-TRAM with an average time of 4.75 days. The shortest average stay was closely followed by the PAP flap technique with an average time of 4.8 days. The S-GAP had an average time of 4.96 days, the numerically most frequent DIEP had an average hospital stay of 4.99 days and the LD flap that was performed only on one patient had a hospital stay of 5 days. The overal average length of hospital stay was thus 4.98 days.

The management of the operations in a private practice differs from that of big institutions such as university hospitals. In the private practice “Pyramide am See”, the admission ordinarily takes place at the same day of the procedure, whereas in university hospitals, the admission takes place the day before the operation. In the private practice no intensive care unit (ICU) stay is required and the patients are transferred directly to the ward, while in the university hospital, the patients usually stay 1-2 nights on the ICU. [18] As a member of the Swiss Leading Hospitals (SLH), the “Klinik Pyramide am See” is committed to the highest standard of quality in quality management, the accreditation of specialists, medical care, nursing, hospitality, and in administration. To become a member of the SLH, 60 mandatory criteria and at least 50 percent of the recommended criteria must be fulfilled. Strict regular assessments must be passed to maintain the membership and the status. In addition, the clinic offers the service and comfort of an exclusive hotel, aiming for the patient to feel at home in a warm and personal atmosphere. [19]

3. Conclusion

Autologous techniques seem to have become a valid and efficient option for breast reconstruction in a private practice setting. This has been suggested by the large number of reconstructions that have been performed and, ultimately, by a visible increase of the number per year. Even though, as mentioned, they come with higher requirements for both the surgeon

and the infrastructure, any further effort of the autologous reconstructions is managed by a specialized and experienced operating team in a modern and well-equipped private practice. As a source of comparison to a hospital, a study from Masoomi H was used. The authors analyzed clinical data of patients that had undergone autologous breast reconstructions in the United States of America, using the National Inpatient Sample. The data of 35'883 patients treated between 2009 and 2010 was analyzed. The main aim of the study was to compare the frequency and results of autologous breast reconstructions between teaching and non-teaching hospitals, which leaves us with two different kinds of big institutions to compare with. The average age of both hospital types was 51 years, which is almost the same as the average age at the private practice, where the average was 52 years. In teaching hospitals 8.1%, in non-teaching 10.8% and in the private practice 11% of the patients were aged over 65 years. An important finding of the study was that free flap reconstructions, which are the most complex types of reconstruction, were performed significantly more in teaching hospitals (46 percent) compared to non-teaching hospitals (31 percent). In our findings, the free flaps were performed in nearly 100 percent of cases. The latissimus dorsi myocutaneous flap was the most frequent in both teaching (26 percent) and non-teaching (39 percent) hospitals. The most frequent free flap was the DIEP in teaching hospitals (26 percent) and the free TRAM in non-teaching hospitals (17 percent), whereas in the private practice, the most frequent flap was the DIEP in 52 percent of procedures. Considering the length of hospital stay, the private practice achieved similar outcomes as the study. In teaching hospitals, the DIEP had an average length of hospital stay counting 4.68 days, in non-teaching 4.37 days and in the private practice 4.99 days. The S-GAP had a mean stay of 5.10 days in teaching hospitals, 6.12 in non-teaching hospitals and 4.96 in the private practice. The MS-TRAM flap had a mean stay of 4.76 days in teaching hospitals, 4.62 in non-teaching and 4.75 in the private practice. The TMG/TUG and the PAP were not included in Masoomi H's study. The LD was performed only once in the private practice, which was considered to be too low to have a comparable significance [20]. However, the data from the techniques that have been compared shows a well-comparable and efficient outcome regarding the length of hospital stay. Concluding from the data available, the private practice performs a variety of complex autologous breast reconstruction procedures. The patients have an optimal choice of operating options, making it possible to treat each patient suited to her own needs, wishes and body habitus. In addition, the clinic offers a great patient care with a variety of leisure options to make the hospital stay as comfortable as possible.

4. Discussion

It was possible to show that autologous breast reconstructions are being successfully and frequently performed in a private practice setting at “Klinik Pyramide am See”. Compared to the teaching and non-teaching hospitals from Masoomi's study, in our analysis of the data from the private practice, nearly all procedures were performed using free flap techniques. These are the most complex autologous techniques, as they require more effort and infrastructure then the pedicled techniques and ultimately they need a high competence and confidence of the operating surgeon. With a highly specialized team and a high standard infrastructure, the private practice is able to perform these operations on a high level.

It should be considered that even though Masoomi's study was published in 2014, the evaluated reconstructions dated back to 2009 and 2010. As the situation may have changed within these few years, in respect of this, one should be careful to compare it to a present situation. Secondly, the source of the evaluated data originates from the United States, which may have different

approaches and guidelines. However, if we analyze the procedures in the private practice in the year 2010, we may draw the same conclusion as before. In 2010, one hundred percent of reconstructions were performed using free flap techniques.

Another point that should be considered regarding the length of hospital stay is that we have been only able to compare three out of six techniques that have been used in the private practice. The second most frequently occurring technique in our analysis is among those three techniques that have not been used. Furthermore, we encounter the same above-mentioned situation when comparing those three methods to Masoomi's study. However, the outcome was well-comparable and on a similar level as the teaching and non-teaching hospitals. In the case of the reconstructions using the S-GAP flap, the results were beneficial, especially compared to the non-teaching hospitals.

Altogether, the consideration of our data shows us the competence and efficiency of the private practice, which is at least as high as in the big institutions.

Ultimately, we have been able to prove that nowadays, autologous breast reconstructions are being performed in a private practice setting. Despite the fact that these techniques are more demanding both to the operating team and the infrastructure, the private practice has the standards and resources to meet the requirements, and the resident surgeons have the confidence and high experience to perform these operations.

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