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Correspondence and Communications

A novel plastic surgery simulation model for medical students

Dear Sir,

Despite most training programs moving towards competency-based training programs 1, the Halschedian principle of “See one, do one, and teach one,” still often applies to Surgery. The learning curve in Plastic Surgery can be challenging, including a melange of advanced skills and complex decision making, on a background of substantial diversity and numerous low volume procedures 2. To mitigate this, early incorporation of simulation-based learning (SBL) has become an increasingly popular concept, and currently is the backbone for many of the training programmes. However, exposure to plastic surgery at medical school is still limited 3, putting off several students from considering plastic surgery as a potential future career.

To this end, we describe a novel set up, which encompasses the use of ex-vivo and in-vivo animal simulation as part of a novel international multifaceted wet lab course called “Essential Skills in the management of Surgical Cases - ESMSC Marathon Course (esmsc.gr)” 3. The purpose was to provide an overview of the core competencies in plastic surgery which could eventually be applicable at the undergraduate level. We also aimed to assess whether such initiatives increase engagement and motivation towards a plastic surgery career. The course combines high fidelity in vivo (swine model) SBL with ex vivo or dry lab simulation. It also includes small group teaching in basic and applied surgical science, along with dedicated non-technical skills stations. ESMSC Marathon course iG4 curriculum version combines training in various surgical specialities, set up in discrete clusters to allow optimisation of the core skills for each speciality.

Delegates across the EU and Asia are selected via a competitive process which includes submission of curriculum vitae and statement of interest. Faculty includes senior house officers, specialist registrars and consultants mainly from the UK and Europe. 115 medical students from 3 series of the course participated in this study’s performance assessment and filled out focused feedback forms.

Initially, we provided dedicated teaching on basic suturing techniques as an introductory step, describing an overview of the fundamentals in subcuticular and interrupted sutures using an ex-vivo swine model. Following this, we designed a dedicated ex-vivo skin setting as a didactic tool, focusing on performing a rhomboid flap and a modified c-v flap nipple reconstruction (Fig. 1). We also incorporated a more advanced in-vivo model to demonstrate procedures available in autologous Breast reconstruction such as a pedicle LD or a DIEP/TRAM free flap; each medical student acted as first assistant aiming to demonstrate the principle of flap surgery including perforator blood supply. An escharotomy can be a common life and/or limb-saving procedure in plastics; to our knowledge achieving this competence can be challenging. Based on this, we developed a second dedicated in-vivo swine model at appropriate timepoints to ensure most economical and judicious use of the model along with other specialities (Fig. 2).

This curriculum was supplemented by a dedicated lecture on management of burns, along with a lecture on essential cases in plastic surgery.

Delegates were assessed twice raising a rhomboid flap during the in-vivo stations, at the start and at the end of the teaching session. For all the assessments we used standardised scales as per the Direct Observation of Procedural Skills (DOPS). DOPS has been chosen by the Intercollegiate Surgical Curriculum Programme as a standardised means of assessing skills-based competence for local flap design and execution (iscp.ac.uk). For the purpose of this letter, we have focused only at the Global Rating Scores which includes a 0-4 scale. Faculty members were debriefed on the assessment process before each series of the course to achieve standardized results. We performed inferential descriptive statistics to compare students’ performance before and after dedicated teaching on each module. Mean performance improvement was assessed with paired t-test. Analysis took place on IBM SPSS for Macintosh version 25.

The global mean performance prior to demonstration 2.45 ± 0.49 and after 3.24 ± 0.50. There was a statistically significant mean improvement of 0.79/4 (CI:0.68–0.89), p < 0.01. The performance improvement was not associated with medical school or gender of the delegates (p > 0.01 for all associations). On completion of the course students rated the motivational effect of those modules towards plastic surgery as 7.41/10 ± 1.89.

Interpreting our pilot data, our training module not only was proven to be a promising and inspiring tool for teaching and assessment, but a way to enthuse more doctors about plastic surgery by increasing their engagement and motivation to pursue a career in the field. This can be perceived as a positive response to a recent UK national review, stating that senior medical students lack simple surgical and procedural skills and as junior doctors are at risk of being unable to safely perform practical procedures 3. The use of animal model tissue seemed to supplement the traditional teaching methods, and act as a catalyst to achieve the extra mile
towards engagement for a career in Plastic Surgery. To this end, our multifaceted teaching module as part of a multi-speciality wet lab course could play a vital role, both as a tool to instil inspiration towards a career as a Plastic surgeon, but also, to teach fundamental skills of the speciality at an early stage. Such courses should be complimented by a structured curriculum which complies with the strictest ethics recommendations in order to replace, refine and reduce animal use where possible.

Ethics

The ESMC course application of ethical approval met directive 63/2010, PD 56/April 2013 declaration, according to local policy (license reference number is 4857/15-09-2017, MS, AP et al.). All applicable international, national, and/or institutional guidelines for the care and use of animals were followed. ESMC is compliant with Helsinki declaration for animal model research, keeping with 3R principles (reduction, refinement, replacement). High level Veterinary anaesthesia was delivered according to recognised protocols to ensure the highest standard of wellbeing for the animals. All members faculty and delegates have given consent for publication of any photographs taken during the course.

Funding of the project

The series of those experiments took place as part of the Essential Skills in the Management of the Surgical Patient - ESMC at the Experimental Research Centre ELPEN S.A [Pikermi, Athens, Greece] and it was provided free to all delegates via a Grant from the same lab.

Conflicts of Interest

None of the authors or the institution have financial or any other interest in the ESMC course.

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The ipsilateral distal upper arm can be useful in harvesting the nonvascularized perifascial areolar tissue for hand injuries

Dear Sir,

Initially described by Kouraba et al. in 2003, nonvascularized perifascial areolar tissue (PAT) grafts have become valuable reconstructive surgery tools because they are minimally invasive and easy to harvest under local anesthesia, leaving a minor scar\(^1\).\(^2\). The size limitation of the wounds with exposed tendons and/or bones has not yet been determined. Miyanaga et al. reported that a wound with a width of \(\leq 3\) cm was treated successfully with nonvascularized PAT grafts and topical basic fibroblast growth factor\(^3\). Nonvascularized PAT is composed of loose connective tissue, collagen, and an abundant vascular plexus. It is found in the deep muscular fascia, overlaying deep fat. Most reported cases involved the inguinal region (located on the fascia of the abdominal external oblique muscle) because the scar was covered by underwear. The thigh (located on the fascia lata) was a commonly used donor site\(^1\).\(^3\). Both sites provided adequate tissues for harvesting sufficient nonvascularized PAT. An additional local or lumbar spinal anesthesia is necessary when the recipient site (wound site) is in the upper extremity.

This report proposed the utility of harvesting nonvascularized PAT from the ipsilateral distal upper arm due to its advantages when the recipient site is in the upper extremity (especially hand injuries). The amount of PAT located in the tendon of the triceps brachii muscle is similar to that in the inguinal or thigh region. First, additional anesthesia for PAT harvesting is no longer needed, and the risk of local anesthetic intoxication is less because the axillary block anesthesia contains both the donor and recipient sites. Second, subcutaneous tissue becomes watery and edema-like following local anesthesia. This makes it challenging to harvest nonvascularized PAT continuously. We harvested it from the posterior or posterolateral aspect of the distal upper arm (Figure 1). The procedure was safe and had no risk of postoperative elbow joint contracture. We recommend harvesting nonvascularized PAT from the ipsilateral distal upper arm for hand injuries.

Funding

N / A

Ethical approval

The patient provided informed consent, and the study design was approved by the appropriate ethics review board.
Figure 1 Nonvascularized perifascial areolar tissue (PAT) is harvested from the ipsilateral distal upper arm. PAT is located on the tendon of the triceps brachial muscle.

Declaration of Competing Interest

The authors declare no Conflict of Interest for this article.

Acknowledgments

None

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“Finger replantation as an office hour procedure: Is overnight delay safe?”

Dear sir,

Finger replantation has been conventionally performed as an emergency procedure with the intent to minimize ischemic damage to the devascularized part. On the other hand, performing an emergency replantation places significant burden on manpower, cost, and resources. In addition, occasionally, a patient with a digital amputation may present with other more serious injuries that do not permit the performance of immediate replantation. In fact, serious or life threatening concomitant injuries is widely accepted as a contraindication for digital replantations.

Multiple studies show no difference in success rates or long-term outcomes after successful digital replantations even with prolonged cold ischemia time approaching 24 h or more.1,3

Based on the senior author’s (AG) experience in replantation and a review of literature, from 2016 to 2018, as a policy change, we chose to delay digital replantation till the next morning, for those patients that came at night beyond working hours (9 am to 9 pm), with their consent. The objective was to compare and evaluate the benefits or detrimental consequences of delaying the replantation overnight.

Our retrospective cohort study was conducted at a single institute over 18 years, from 2000 to 2018 as per the standard ethical guidelines and after approval of the Institutional Ethical board. Patients with severe crush and mangled, and those who were medically unfit for the procedure, were excluded.

Based on literature available,3,15 we chose a maximum permissible warm ischemia time of 12 h and cold ischemia time of 24 h in our practice and for this study. In the ‘immediate’ group, replantations were performed irrespective of the time of day. The ‘delayed’ group comprised of consenting patients that presented late at night after 9 pm with less than 12 h of previous ischemia time and the severed digit adequately cold preserved.

Using evidence from literature,1,7-13 patients were given an option to delay their replantation till the following morning. Those who agreed were included in the overnight delayed group. In the delayed group, the amputated part was wrapped in saline moistened gauze, placed in a water-tight bag, and stored at 4 °C in the refrigerator. Patients were admitted for preoperative work-up and counselling. The replantation was performed the following day at 8 am, and
the OT schedule readjusted accordingly. Also included in the delayed group were patients who presented during office hours with associated life threatening injuries that precluded immediate replantation but were considered for delayed replantation once they were stable.

Replantations were performed as described in Green’s Operative Hand surgery (supplemental text). The patients were discharged after 3-4 days. We started hand therapy as soon as the wounds healed. Bone union was checked with the help of plain X-Rays. Functional evaluation was performed at one year follow-up as per Chen’s criteria (Table 3, supplemental material) and patients were classified into Grades I through IV based on the extent of motor recovery as assessed by total active movement (TAM) across the joints of the involved digit(s) and muscle power grade, sensory recovery as evaluated by the static 2-point discrimination test (S2PD) and finally, the extent of their vocational rehabilitation.

In the ‘immediate’ group, there were 142 digital replantations from 112 patients. There were 18 digital replantations in the delayed group from 17 patients. Mean Total Ischemia time and Cold Ischemia time were significantly higher in the delayed group (19.4 and 15.7 h). Success rates were almost identical without any statistically significant difference in both the immediate and delayed groups and were comparable to the reported success rate of 80% - 90% of other studies. Three digital replantations out of 18 digits failed in the delayed group (Table 1). Early functional outcomes with regards to sensory, motor and esthetic recovery in both the groups were comparable and were similar to the reported outcomes mentioned in earlier literature (Table 2). Apart from tip necrosis, we did not notice any major complications in our series.

Apart from multiple case series, meta-analysis such as Shaterian et al. and Ma et al. have shown that ischemia time does not significantly influence replant survival. (Supplemental text, supplemental references).

Extremity replantation is one of the most technically demanding surgery. To start such a surgery at the end of a busy day poses several logistic difficulties. Surgeons who do perform replantations in the night may then find it challenging to go through the next day’s elective list particularly if they work in small teams without sufficient backup. This not only adds to their job-related stress but may also affect their quality of work. This is reaffirmed by the findings of Breahna A et al. and Woo et al., who mentioned significantly improved chances of survival in replantations done within office hours.

Co-existing life-threatening injuries or medical conditions is widely accepted as a contraindication to digital replantations. However, some of these patients may be candidates for a delayed replantation provided their injuries and medical conditions can be satisfactorily managed within 24 h or so of their initial presentation. Four of 17 patients included in the ‘delayed’ group presented during office hours but could not be taken up for immediate replantation because of concomitant injuries or conditions. (Table 2).

We took necessary precautions in order to successfully adopt an overnight delay protocol (see supplemental text).

Based on this retrospective analysis and review, we can infer that delaying the replantation overnight may not only benefit the surgical team but also select patients who otherwise would have been denied the surgery that can restore their severed digits.

Our study was limited by the sample size and short follow up duration of the delayed group. Experience from other replantation centers and larger group and duration studies are required to standardize the overnight delay protocol.

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**Table 1  Comparison of different parameters of the replantation group.**

| Parameters            | Immediate Group (n = 142) | Delayed group (n = 18) | p-value |
|-----------------------|--------------------------|------------------------|---------|
|                      | Number of Digits         | Number of Digits       |         |
| A. Distribution of cases |                          |                        |         |
| Single digit          | 83 (58.5%)               | 10 (55.6%)             | 0.66 NS |
| Multiple digits       | 59 (41.5%)               | 8 (44.4%)              | 0.77 NS |
| Thumb                 | 41 (28.9%)               | 7 (38.9%)              | 0.14 NS |
| Index                 | 51 (35.9%)               | 4 (22.0%)              | 0.029 S |
| Middle                | 27 (19.0%)               | 4 (22.2%)              | 0.59 NS |
| Ring                  | 13 (9.2%)                | 2 (11.1%)              | 0.63 NS |
| Little                | 10 (7.0%)                | 1 (5.6%)               | 0.84 NS |
| Mean Age (mean ± SD) | 35 ± 2                   | 35 ± 3                 | 0.78 NS |
| (in years)            |                          |                        |         |
| B. Mean Ischemia time (mean ± SD) (in hours) | 2.7 ± 1.1 | 3.7 ± 1.2 | <0.001 S |
| Warm                  |                          |                        |         |
| Cold                  | 1.1 ± 0.7                | 15.7 ± 3.3             | <0.001 S |
| Total                 | 3.8 ± 1.4                | 19.4 ± 3.4             | <0.001 S |
| C. Outcome            |                          |                        |         |
| Success               | 117 (82.4%)              | 15 (83.3%)             | 0.85 NS |
| Failure               | 25 (17.5%)               | 3 (16.7%)              | 0.84 NS |
| Tip necrosis          | 9 (6.3%)                 | 1 (5.6%)               | 0.99 NS |

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(Continued...)


Table 2: Functional outcome at one year follow up in delayed replantation group.

| Case | Digit affected | Reason for delay | TAM (mm) | Power | S2PD (mm) | Functional outcome (Chen Grade) | Complications |
|------|----------------|------------------|----------|-------|-----------|---------------------------------|---------------|
| 1    | Thumb          | a 130°           | 5        |       | 10        | I                               |               |
| 2    | Middle         | a 240°           | 5        |       | 12        | I                               |               |
| 3    | Thumb          | b 130°           | 5        |       | 10        | I                               |               |
| 4    | Middle         | a 240°           | 5        |       | 8         | I                               |               |
| 5    | Index          | c 230°           | 5        |       | 10        | I                               |               |
| 6    | Middle         | c                | -        |       | -         | -                               | Failure 3     |
| 7    | Ring           | a 240°           | 5        |       | 14        | I                               |               |
| 8    | Little         | a 240°           | 4        |       | 8         | I                               |               |
| 9    | Index          | a                | -        |       | -         | -                               | Failure 3     |
| 10   | Thumb          | d                | -        |       | -         | -                               | Failure 3     |
| 11   | Index          | a 230°           | 4        |       | 10        | II                              |               |
| 12   | Thumb          | a 140°           | 4        |       | 14        | II                              |               |
| 13   | Middle         | a 180°           | 4        |       | 12        | II                              |               |
| 14   | Thumb          | b 110°           | 5        |       | 10        | II                              | Minor nail abnormality |
| 15   | Ring           | a 180°           | 5        |       | 12        | II                              |               |
| 16   | Thumb          | a 110°           | 5        |       | 10        | III                             | Tip necrosis  |
| 17   | Thumb          | a 70°            | 3        |       | 14        | III                             |               |

1. Reason for delay: a - Presenting after office hours b - Victims of physical assault with severe associated injuries and consequent hemorrhagic shock requiring prolonged resuscitative efforts including surgical exploration, to allow stabilization c - Multiple comorbidities including recent coronary bypass and history of chronic smoking necessitating optimization before replantation surgery d - Chronic substance abuser with self-inflicted digital amputation. He required psychiatric evaluation, counselling, and observation before he was deemed eligible for the replantation.
2. Fourteen patients returned to their previous occupation, while three had to move to alternate work.
3. Failures were managed with terminalization of their amputation stumps.

Declaration of Competing Interest
None.

Ethical approval
The study was approved by our Institutional Ethical Board.

Statement of human and animal rights
The article does not contain any studies with human or animal subjects.

Financial disclosure statement
None of the authors have a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

Supplementary materials
Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2022.01.016.

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Transcapsular access for the excision of primary or recurrent breast tumors in women with implant reconstruction

Dear sir,

Sparing mastectomy (SM) constitute the decisive element for optimizing the cosmetic results of immediate breast reconstruction (IBR). Various studies have evaluated this procedure and have concluded that the incidence of relapses is low and similar to that observed in modified radical mastectomy (MRM)\(^1\),\(^2\).

Diagnosing a recurrence or primary tumor in a woman with breast reconstruction using implants represents a challenge for the surgeon. First, complete extirpation of the tumor and the compatibility with the rest of the oncologic treatments need to be ensured. Second, the need of a procedure that ensures a minimum of cosmetic deterioration. The transcapsular approach (TA) meets these requirements in patients with implants reconstruction and is characterized by low morbidity and high resolution for the tumor extirpation.

We conducted a retrospective study of patients with a breast carcinoma and women with high risk for breast cancer who underwent a SM and IBR with implants. The study group consisted of patients who had been diagnosed with a primary or recurrent tumor in the mastectomy flaps and who underwent tumor extirpation using a TA.

Prior to the operation, a metal guide was placed to locate the tumor. The operation employed an approach through the previous scar or through an incision in the submammary fold to access the periprosthetic capsule and (Figure 1). The implant was subsequently withdrawn, and the skin flap was everted through the incision, thereby allowing for the approach to the lesion from the intracapsular plane. The capsule was incised, and once in the subcutaneous area, the tumor was identified by following the metal guide in this plane (Figure 2). Titanium clips were placed to mark the tumor bed. Lastly, aspiration drainage was placed, and the previous implant reintroduced.

During the study period (2008-2020), 306 patients underwent a SM and IBR with a mean patient follow-up of 6.8 ± 4.4 years. The actuarial incidence rate of relapses in the skin flap was 1% (95%CI 0.3–1.7%) and 2.3% (95%CI 0.8–3.8%) at 5 and 10 years, respectively.

We studied 6 patients with a previous mastectomy who underwent tumor resection through a TA (Table 1). Three patients initially presented an infiltrating ductal carcinoma (Luminal B HER2 negative subtype), two patients’ ductal carcinoma in situ and one woman was initially operated for high risk (BRCA1 mutation). One relapse was in the form of ductal carcinoma in situ and the rest as infiltrating carcinomas. Radio-guided lumpectomy was performed successfully in all patients and the resection margins were appropriate. All patients underwent radiation therapy after the extirpation of the relapse and after a mean follow-up of 30 months (range, 2–91 months), none showed new relapses, distant metastases or died. One patient presented deformity due to radiodermatitis.

Locoregional recurrence after IBR is an uncommon event, with an incidence rate at 5 and 10 years of 2.3% and 2.8%, respectively\(^3\), similar to that shown in our experience. Various studies\(^4\)–\(^5\) have analyzed the residual glandular tissue (RGT) after mastectomy and have identified that the surgeon, the anatomical location, the type of mastectomy, the thickness of the skin flap and the indication for mastectomy (more common in RRM) are risk factors for the onset of tumors. Despite these circumstances, SM is considered a safe and effective procedure with incidence relapses similar to MRM\(^1\),\(^2\).

TA involves simple access, with low morbidity and that, in most cases, allows the original reconstruction to be pre-

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Figure 1 Opening of the subcutaneous tissue and access to the capsular cavity after the sectioning of the capsule.

Figure 2 Subcutaneous lumpectomy of the tumor marked with the metal guide.
served. Other applications of TA include extirpation of primary breast tumors in women with breast augmentation implants and the extirpation of RGT after SM.

TA shares certain criteria with breast-conserving surgery, given that the former is the local radio-guided precise resection of a previously located lesion, an extirpation with disease-free margins and the marking of the surgical site with clips to indicate the resection area. Adjuvant radiation therapy is a therapeutic option that should be evaluated to improve locoregional control.

In conclusion, the TA is an alternative technique appropriate for extirpating tumors in women with breast reconstruction using implants. It allows a minimum cosmetic impact on the reconstructed breast.

### Disclosures and funding sources

No

### Ethical approval

The study has been assessed and approved by our community research ethics committee (reference number: 2014/140).

## Table 1  Clinicopathological characteristics of the patients.

| Tumor type         | Patient 1 | Patient 2 | Patient 3 | Patient 4 | Patient 5 | Patient 6 |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Primary             | IDC       | DCIS      | IDC       | IDC       | DCIS      | High risk |
| Recurrent           | DCIS      | IDC       | Tubular   | IDC       | IDC       | IDC       |
| Tumor size, cm      | 0.5 (pT1a) | 2.5 (pT2) | 1 (pT1b)  | 3 (pT2)   | 4 (pT2)   | -         |
| Primary             | 1 (pTis)  | 0.5 (pT1a) | 0.5 (pT1a) | 1 (pT1b)  | 0.5 (ypT1a) | 0 (cT1c) (ypTx) |
| Location            | Primary    | Recurrent  | Primary    | Recurrent  | Primary    | Recurrent  |
| Primary             | LIQ/LOQ right breast | UQQ/LOQ right breast | LIQ left breast | UQQ/LOQ right breast | LIQ left breast | UQQ right breast |
| Mastectomy type     | Primary    | Recurrent  | Primary    | Mastectomy | Primary    | Mastectomy |
| Primary             | Luminal B | Luminal B Her2- | Luminal B Her2- | Infra mammary | Infra mammary | Type I SSM |
| Axillary surgery    | Primary    | Recurrent  | Primary    | Axillary surgery | Primary    | Axillary surgery |
| Primary             | SLNB       | SLNB       | SLNB       | SLNB       | SLNB       | SLNB       |
| Recurrent           | None       | SLNB       | None       | None       | SLNB       | SLNB       |
| Axillary involvement| Primary    | Recurrent  | Primary    | Axillary involvement | Primary    | Axillary involvement |
| Primary             | No         | No         | No         | No         | No         | No         |
| Recurrent           | -          | -          | Positive (pN3) | -          | Negative  |
| Adjuvant therapy    | Primary    | Recurrent  | Primary    | Adjuvant therapy | Primary    | Adjuvant therapy |
| Primary             | CTx + HT   | None       | HT         | CTx + HT   | None       | -          |
| Recurrent           | RT         | RT + HT   | RT + HT   | CTx + HT + RT | Neoadjuvant CTx | Neoadjuvant CTx + RT |
| Abbreviations: ALND, axillary lymph node dissection; CTx, chemotherapy; DCIS, ductal carcinoma in situ; HT, hormone therapy; IDC, infiltrating ductal carcinoma; LIQ, lower inner quadrant; LOQ, lower outer quadrant; NSSM, nipple/skin-sparing mastectomy; RT, radiation therapy; SLNB, sentinel lymph node biopsy; SSM, skin-sparing mastectomy; UQQ, upper inner quadrant; UOQ, upper outer quadrant. |

## Declaration of Competing Interest

None.

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A preliminary evaluation of surgical field contamination risk from surgeon's oro-nasopharyngeal commensal organisms while using reusable FFP3 respirator masks and power hoods with relevance to the COVID 19 pandemic - A pilot study

Dear sir,

Aims

To establish if vented powered air purifying respirators (powerhoods) and reusable valved FFP3 respirators allow bacterial contamination of the surgical field from the surgeon's upper aerodigestive tract.

Methods

Five experienced surgeons were randomly selected from within our plastic surgery department. Each surgeon was asked to use five different face coverings including no mask, normal surgical mask, half-head air-blown hood (Scotts™), full head shrouded powerhood (Easi-Air™) and a valved, reusable filtered FFP3 respirator mask (3M™) for 30-minute sessions each in a sterile theater environment. A pair of Sabouraud (Sab) agar and blood agar bacterial culture plates were placed at the working point of each surgeon on the operating table next to an e-reader. The surgeon had to read one sentence aloud every minute throughout the 30 min. Another set of plates were kept in the theater distant to the surgeon's field to measure theater background bacterial activity. The surgeon had to break out of theater for 5 - 10 min between each test. The plates were then sent to the microbiology lab and cultured to identify colony forming units (CFUs). Order of face coverings was randomized between the surgeons; the surgeons were labelled from A to E and random numbers were allocated to the different sets of plates so that the lab was blinded. The lab results were then tabulated.

Results

The bacterial counts indicated by the number of Colony forming units (CFUs) from each set of cultured plates are shown in the table below.

| Surgeon | No mask | Surgical mask | Half-head hood | Shrouded full-head hood | Reusable FFP3 valved mask |
|---------|---------|---------------|----------------|-------------------------|--------------------------|
| A       | 12      | 2             | 0              | 0                       | 0                        |
| B       | 11      | 2             | 2              | 0                       | 2                        |
| C       | 0       | 0             | 0              | 0                       | 1                        |
| D       | 0       | 0             | 0              | 0                       | 0                        |
| E       | 0       | 0             | 0              | 0                       | 1                        |
| total   | 23      | 4             | 2              | 0                       | 4                        |
| theater plates | 0     | 0             | 1              | 0                       | 0                        |

Discussion and conclusions

This tiny study cannot provide any strong evidence in relation to different types of surgical masks and perhaps does no more than demonstrate the feasibility of a larger scale study using this technique. However, our results appear to illustrate that:

- Some surgeons shed more bacteria than others.
- Normal surgical masks and both types of powerhoods reduce the shed bacterial count; powerhoods being better than passive masks. The full head shrouded powerhood may be better than the half-head hood.
- The valved reusable FFP3 mask was the only mask where bacteria were collected from surgeons who otherwise did not shed bacteria, even without a mask.
- There is no evidence that any of the above translates into SSI.
- The study has a small sample size and therefore has no statistical significance but gives an indication that surgical masks and power hoods do not increase the risk of bacterial contamination of the surgical field and thus SSI. However, the reusable valved FFP3 masks may need to be further evaluated. Further studies with increased sample sizes are recommended.
Figure 1  Clear mask valve showing condensation from exhaled breath after 30 min.

Subsequently valved FFP3 masks were studied. Exhaled vapor condenses in the exhaust valve, it is detectable by “blotting” the valve in a 3 M mask but is also clearly visible in a similar but widely used valved reusable mask (JSP™) (Figure 1). After as short a time as 30 min water droplets coalesce into a size such that they drip from the exhaust valve. It is postulated that exhaled bacteria and viruses are concentrated in these droplets and may contaminate the surgical field by dropping on to it.

Funding source
None

Ethical approval
N/A

Declaration of Competing Interest
None.

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Appropriate loupe magnification for lymphatic vessel dissection during a line production system for multiple lymphaticovenular anastomoses

Dear Sir,

Introduction
A surgical line production system using loupes is a cost-effective way of performing multiple lymphaticovenular anastomoses (LVAs).¹ Dissection of lymphatics under loupes is, however, correct selection of magnification is important when using loupes. The aim of this cross-sectional study was to determine the ability of blunt dissection under loupes and the appropriate loupe magnification in this technique.
Patients and methods

The study protocol was approved by our institutional ethics committee and was performed in accordance with the Declaration of Helsinki and in strict adherence to the STROBE guidelines. All patients provided written informed consent. We compared the detection rates for lymphatics and veins of the two groups that were defined by whether the magnification of loupes was 2.5 × or 4 × against the control group that were defined by the dissection performed by experts under operating microscope. Patients were randomly allocated to a 2.5 × group or a 4 × group according to hospital ID number (dissection was performed using 2.5 × loupes for odd numbers and using 4 × loupes for even numbers). The diameter of the lymphatics was also compared between the groups. The study design was almost same as the previous report except for the comparison was performed between the line production system groups, the 2.5x loupes group (2.5x) and the 4x loupes group (4x).

Results

There was no significant between-group difference in severity of lymphedema or the number of performed LVA s. There was no significant difference in the mean vein detection rate among the 2.5 × , 4 × , and microscope groups. However, the mean lymphatic detection rate was significantly higher in the 4 × and microscope groups than in the 2.5 × group. The mean detected lymphatic diameter was significantly smaller in the 4 × and the microscope groups than the 2.5 × group (Table 1.)

Discussion

This data provides a meaningful clinical advancement. We believe the time lag between dissection and anastomoses helps to reduce spasm and makes it easier to find lymphatics. Using loupes for dissection cost much less than microscopes. The method using multiple microscopes often interferes with each other, which sometimes leads to a delay in performing LVA s. It is not always necessary to complete identification and dissection of lymphatics and veins at the stage of blunt dissection under loupes because further dissection and identification can be performed under a microscope if identification is not completed under loupes. However, it is desirable to identify lymphatics and veins at the stage of blunt dissection under loupes because our line production system is a method devised to allow as many LVA s as possible to be performed in a limited amount of time.

Lymphatics are transparent vessels but need to be distinguished from nerve and fibrous tissues visually for LVA if fibrosis and sclerosis have occurred as a result of lymphedema progression. We distinguish fibrotic and sclerotic lymphatic vessels from nerves by the node of Ranvier, which appears on nerves as a horizontal stripe pattern. However, it is likely that a loupe magnification of at least 4 × is necessary for accurate discrimination. On the other hand, veins are easily distinguished because they contain blood, and so can be detected at a lower loupe magnification. Discrimination of lymphatics is performed mainly morphologically or visually. Therefore, we believe that the lymphatic detection rate depends on the magnification of the loupes used. Patent blue injections or preoperative echography is helpful to augment lymphatic identification with lower powered magnification.

Previous studies have investigated whether or not differences in magnification between loupes and microscopes affect the results of surgery, and have suggested that the results are not significantly different from those obtained when the same procedures are performed under a microscope. However, other reports have attributed the outcomes to the experience and skill of the surgeon. Experienced surgeons presumably rely not only on vision but also on the slight tactile sensations felt through microsurgical instruments when performing microsurgery.

So far, there have been no published comparisons between different loupe magnification levels. There might be some concerns that the attempted dissection of lymphatics under loupe magnification will result in injury to these delicate structures. However, although this is empirical and expert opinion, lymphatics are much more durable than common belief. Hence, dissection under loupes does not damage lymphatic vessels as long as performing blunt dissection. Thin structure of lymphatic vessels has highly and strongly elastic features. In this study, all dissection under loupes were performed by blunt dissection, because sharp dissection will have high possibility to damage lymphatics because of thin structure of wall (Supplemental video).

Conclusion

Lymphatics are detected morphologically or visually. Lymphatics can be identified based on knowledge of the visual characteristics of these structures. However, a magnification higher than 4 × is likely necessary for accurate discrimination. Lymphatics are much more durable than common belief. Hence, dissection under loupes does not damage lymphatic vessels as long as performing blunt dissection.

Declaration of Competing Interest

None.

Funding

None.

Ethical approval

The protocol of this study was approved by the institutional review board of Hiroshima University Hospital.
Table 1 Comparison of the mean lymphatic and vein detection rates and the mean diameter of the lymphatics detected according to whether 4× loupes or 2.5× loupes were used against the control group that were defined by the dissection performed under operating microscope. Data are shown as the mean ± standard deviation (range).

|                          | LPS with 2.5x loupes | LPS with 4.0x loupes | Microscope dissection | p-value     |
|--------------------------|----------------------|----------------------|-----------------------|-------------|
| Number of Lower limbs    | 10                   | 10                   | 10                    | 1.0 (Chi-square test) |
| Stage (ISL classification; Ila/III) | 7/3 | 7/3 | 7/3 | 0.56 (Student’s t-test) |
| Number of Dissected area | 4.4 ± 0.84(3-6) | 4.2 ± 0.63(3-5) | 4.2 ± 0.63(3-5) | 0.38 (Student’s t-test) |
| Number of LVA in lower leg | 2.7 ± 0.67(2-4) | 2.7 ± 0.48(2-3) | 2.7 ± 0.48(2-3) | 0.38 (Student’s t-test) |
| Number of LVA in thigh   | 1.7 ± 0.48 (1-2) | 1.5 ± 0.53 (1-2) | 1.5 ± 0.53 (1-2) | All >0.05 (Steel-Dwass test.) |
| vein detection rate (%)  | 95.5 ± 9.6(75-100) | 93±11.35 (75-100) | 93.1 ± 11.1 (60-100) | 2.5 × VS 4.0 ×; p<0.05 |
| lymphatics detection rate (%) | 51.5 ± 18.5 (20-83) | 81±15.60 (50-100) | 91.8 ± 14.3 (60-100) | 2.5 × VS micro; p<0.01 |
| vein detection rate (%)  | 95.5 ± 9.6(75-100) | 93±11.35 (75-100) | 93.1 ± 11.1 (60-100) | 4.0 × VS micro; p<0.05 |
| diameter of detected lymphatics (mm) | 0.51±0.08 (0.4-0.7) | 0.44±0.12 (0.2-0.7) | 0.46±0.20 (0.1-0.9) | 2.5 × VS 4.0 ×; p<0.05 |
| lymphatics detection rate (%) | 51.5 ± 18.5 (20-83) | 81±15.60 (50-100) | 91.8 ± 14.3 (60-100) | 2.5 × VS micro; p<0.05 |
| vein detection rate (%)  | 95.5 ± 9.6(75-100) | 93±11.35 (75-100) | 93.1 ± 11.1 (60-100) | 4.0 × VS micro; p<0.05 |
| diameter of detected lymphatics (mm) | 0.51±0.08 (0.4-0.7) | 0.44±0.12 (0.2-0.7) | 0.46±0.20 (0.1-0.9) | 2.5 × VS 4.0 ×; p<0.05 |

ISL: International Society of Lymphology.
LPS: Line Production System for multiple lymphaticovenular anastomosis.
LVA: Lymphaticovenular Anastomoses.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j bjps.2022.01.013.

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Immediate lymphatic reconstruction: Outcomes of a single-institution pilot study

Dear Sir,

Introduction

Interest in prophylactic surgical intervention to decrease the rate of breast cancer related lymphedema is growing. In Boccardo et al. introduced LVB at the time of axillary lymph node dissection (ALND). Their initial results demonstrated statistically significant differences in lymphedema development in the control arm (30.43%) compared to the treatment arm (4.34%).\(^1\)\(^2\) A 4 year follow up by the same group demonstrated a 4% incidence of lymphedema after ILR.\(^3\) Subsequent reports of ILR outcomes from other institutions show similarly promising results. However, these studies have low numbers of patients, ranging from 8 to 35, and short follow up, ranging on average from 6 to 15 months.\(^4\) The body of literature would benefit from additional publications on this topic with follow up of at least one year. Our study aims to add to the limited available data regarding ILR by describing our experience with our previously reported ILR technique.\(^5\)

Methods

A retrospective review was conducted on all patients who underwent unilateral ILR after ALND for treatment of breast cancer, from May 2019 to March 2020. Patient demographics, details of the ALND and ILR, treatments for breast cancer, as well as the postoperative course were recorded. Patients who experienced post-operative swelling or subjective lymphedema symptoms were referred to lymphedema therapy. Arm circumference measurements were taken at every 4 cm along the limb and used to calculate limb volume using the truncated cone formula. Measurements were done in both limbs. Patients who were found to have a greater than 10% volume difference compared to the contralateral arm were diagnosed with lymphedema. ILR was performed as previously described by one of three microsurgeons (MC, JHD, BM) following completion of the ALND by the breast surgeon.\(^6\) Briefly, ALND was performed either through the mastectomy incision or through a separate axillary incision. Blue dye, indocyanine green, and/or fluorescein was injected intradermally to the hand and/or upper inner arm to visualize transected lymphatic channels. In most cases, the thoracoepigastric vein was dissected during the ALND and preserved by the breast surgeons. In some cases, other nearby veins were used. If multiple lymphatic channels were identified, the largest channel(s) were targeted first. Transected lymphatic channels were anastomosed to the vein with 9-0 or 10-0 nylon using an intussusception technique. Patency of the anastomosis was verified by flow of lymph/dye through the anastomosis into the vein (Figures 1, 2). Transected lymphatic channels not bypassed were clipped.
Results

A total of 30 patients underwent ILR after ALND during the study time period. Average age was 49.9 (±10.6), average BMI was 26.3 (±6.4). Most patients received post-operative radiation to the chest wall (n = 28, 93%) and many received regional lymph node radiation (n = 15, 50%), neoadjuvant chemotherapy (n = 17, 57%), and adjuvant chemotherapy (n = 16, 53%).

There were 1.9 (±1.0) lymphovenous bypasses performed per patient after ALND. One patient’s surgical drain fell out on post-operative day 2 and subsequently developed a seroma. This was aspirated in clinic. No other complications were noted.

Four patients were excluded from final analysis. One patient had baseline lymphedema with metastatic disease and passed away at 14 months post-operation. One patient passed away from metastatic disease at 5 months post-operation. One patient suffered a catheter related upper extremity DVT. One patient followed-up with outside physical therapy and therefore measurements could not be obtained. Average length of follow-up the remaining 26 patients was 17.4 (±3.9) months. Two patients had developed lymphedema (7.7%) at most recent follow-up. The institutional rate of lymphedema at 18-months follow-up after ALND during a similar time frame was 17.6% (95% CI 12.4 - 24.5%).

Discussion

This report adds to the body of literature showing promising results of ILR in decreasing the incidence of lymphedema. With an average follow up time of a year and a half, only two patients (7.7%) developed lymphedema. Published literature regarding ILR is promising but limited. A systematic review by Jorgensen et al. in 2018 identified 12 studies reporting outcomes of ILR and just 4 of these studies included a control group. All studies including in the systematic review were limited by small sample sizes and lack of long-term follow up. However, they did find patients treated with ILR had a significant reduction in lymphedema incidence (RR: 0.33, 95%CI: 0.19 to 0.56) compared to patients receiving no prophylactic treatment (p<0.001).

This study is limited by its retrospective nature, small sample size, and lack of base-line arm measurements. Further, documentation of current compression therapy was variable and lacking. This area of innovation would greatly benefit from an appropriately powered, randomized controlled trial with baseline measurements and a longer-term follow up (>2 years). We are currently enrolling patients to such a trial at our institution. Results are pending trial completion.

Conclusions

ILR is a safe and effective procedure for reducing rates of lymphedema following ALND. Additional well-designed studies are needed to confirm the benefit of ILR.

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Financial Disclosure Statement

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Ethical Approval

This research was approved by the Institutional Review Board at Memorial Sloan Kettering Cancer Center.

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BreastReconstruction: A qualitative analysis of aesthetic and reconstructive breast surgery photographs on Instagram

Dear Sir,

Social media sites like Instagram have evolved into platforms for patients to learn about desired procedures and view before-and-after photographs. Such information can influence decision-making regarding choice of procedure, surgeon, and hospital, for esthetic and reconstructive breast surgery. Given how impactful social media is towards shaping patients’ expectations, it is imperative that social media content is accurate and comprehensive. However, Instagram, which allows image sharing with relatively few restrictions, leaves potential for misinformation. This study aims to analyze the quality of Instagram posts made related to esthetic and reconstructive breast procedures in accordance with the photographic standards for breast images established by the Plastic Surgery Foundation (PSF) and American Society of Plastic Surgeons (ASPS).

The authors queried Instagram for the top posts using the following 20 breast surgery-related hashtags: #breastreconstruction, #breastrecon, #diepflap, #delayedreconstruction, #areolareconstruction, #nipplereconstruction, #breastaugmentation, #breastaug, #boobjob, #bpe, #breastimplant, #breastimplants, #breastfatgraft, #breastlift, #revisionbreastlift, #mastopexy, #breastreduction, #reductionmammoplasty, #boobreduction, #breastrevisions, and #revisionbreastsurgery. Data was collected on August 8, 2020. At most, the top 30 posts made by US plastic surgery practices consisting of patient photographs were included. Video posts and posts unrelated to the queried hashtag were excluded. Reposts and posts which duplicated content from a previous post under the same hashtag were also excluded. Patient selfies were excluded. The post images and the content of the caption and comments made by the posting account were analyzed. Each image within a post was compared with the PSF and ASPS photographic standards for breast images.

A total of 280 posts containing a median of 2 images and 1 view were identified (Table 1). #breastaugmentation (622,00), #breastimplants (302,000), and #breastlift (244,658) had the greatest total number of posts, while #breastrecon (30), #breastrevisions (27), and #breastaug (24), had the greatest number of posts meeting inclusion criteria. #areolareconstruction yielded no posts meeting this study’s criteria. In the captions, 88% of posts did not disclose patient age, 81% did not state the time that post-operative images were taken relative to the procedure, 96% did not include the recovery time, and none included complications (Table 2). When evaluating photographic quality, 90% of posts failed to meet at least one aspect of the PSF standards.

Table 1 Characteristics of Instagram Posts on Cosmetic and Reconstructive Breast Surgery.

| Post Characteristics          | Mean +/- S.D. | [Minimum, Maximum] |
|-------------------------------|--------------|--------------------|
| Number of Images              | 2.85 +/- 1.43| [1,10]             |
| Number of Views               | 1.41 +/- 0.69| [1,5]              |
| Patient Age                   | 40.42 +/- 12.83| [19,70]         |
| Posting Account Characteristics|                           |
| Geographic Region             | Number of Posts n (%) |
| West                          | 120 (42.9)    |
| South                         | 97 (34.6)     |
| Northeast                     | 37 (13.2)     |
| Midwest                       | 26 (9.3)      |
| Practice Type                 |               |
| Individual                    | 235 (83.9)    |
| Group                         | 45 (16.1)     |
| Board Certification           |               |
| Plastic Surgery               | 278 (99.3)    |
| General Surgery               | 1 (0.4)       |
| Cosmetic Surgery              | 1 (0.4)       |

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Social Media Account (Instagram): @rutgersplasticsurgery
and ASPS Breast Image standards. Specifically, 74%, 41%, and 35% of posts did not follow the photograph framing, positioning, or disrobing standards, respectively (Table 2). Only 55% of posts showed a visible scar. On average, posts are utilizing a median [IQR] of 16 [10,26] hashtags. Additionally, 9% of posts included photographs of patient procedures inconsistent with the queried hashtag.

Typically, while online patient materials commonly are of low quality, social media content created by physicians is of higher quality. However, we found that captions, which allow up to 2200 characters, were rarely detailed and only half of posts showed an obvious scar postoperatively. As sufficient preoperative information regarding healing timelines and final esthetic results can give patients more realistic expectations prior to surgery, increasing the comprehensibility of Instagram post captions may improve patient satisfaction, postoperative health, psychological adjustment, compliance with postoperative regimens, and overall patient outcomes. Most of the top breast-reconstruction related posts on Instagram are not framing, positioning, or disrobing patients according to guidelines, providing sub-optimal views for patients to obtain realistic expectations and assess surgeons’ crafts. This lack of standardization is also present in notable plastic surgery journals. Failure to frame, position, and disrobe the patient in accordance with national standards is particularly concerning because it also increases the risk of revealing patient identities and breaching confidentiality.

In our search, we also came across several posts including photographs of patients who underwent surgeries inconsistent with the queried hashtag. This nonspecific hashtag use by plastic surgeons may be attributed to desire to widen audiences, though at the expense of possible patient confusion between the procedure shown and that searched for.

We acknowledge that Instagram has no standardization currently and is utilized for commercial purposes to increase patient engagement. Therefore, many of these images are edited and stylized to attract greater view counts. While the ASPS/PSF photographic standards for medical records may be too stringent as criteria for social media posts, having set guidelines can help improve the quality of images and information posted by board certified plastic surgeons in comparison to other social media users. A balance can be achieved between high quality images that increase engagement but also promote accurate patient education. Solutions to improving the quality of such Instagram posts include increased education of board-certified plastic surgeons on national photographic standards, patient education on possible misinformation or poor-quality images in social media posts, and the creation of technology committees that exert some form of quality control over plastic surgery-related content on social media. With these changes, patients will be better equipped to make informed decisions regarding desired breast reconstructive procedures.

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### Informed consent
Not applicable

### Statement of ethical approval
Not applicable - does not qualify as human subjects research as only publicly available data was used for analysis that was not pertaining to any one institution.

### Declaration of Competing Interests
The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
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Usage trends, perceptions and ethical views regarding social media: A survey of Canadian plastic surgeons

Dear sir,

It is crucial for all plastic surgeons to be cognizant of Social Media (SoMe) as aside from utilizing it to attract patients, there is also a significant potential in developing one’s academic success. While there have been many studies analyzing SoMe trends in plastic surgery, there is a paucity regarding academic surgeons and countries other than the U.S. The primary goal of this study is to assess the usage trends, perceptions and ethical views of Canadian plastic surgeons regarding SoMe.

An anonymous online 16-item questionnaire assessing demographics, usage trends, general attitudes and ethical views toward SoMe (Supplementary Data 1) was emailed to all members of the Canadian Society of Plastic Surgeons (CSPS) twice between February and April 2020. Responses were pooled across all participants for descriptive data analysis, and stratified by account type.

The survey received 62 responses from a potential 436 full CSPS members (14.2%), all being able to practice independently. The majority (55%) were plastic surgeons that worked in an academic center and in a community esthetic practice, which is mirrored in a recent survey of Canadian plastic surgeons. Thirty-seven percent of participants had a single SoMe account for both personal and professional use, 27% a personal account, 19% just a professional account, 5% managed two separate accounts and the remainder (11%) did not have a SoMe account. The data is presented according to these groups.

Table 1 summarizes all of the SoMe usage data collected in our survey. It suggests a lack of active SoMe usage as 40% of respondents that used SoMe (n = 22/55) posted at most once a week and 64% (n = 35/55) had less than 1000 followers. McEvneue et al. echo this by showing that only 49% of Canadian plastic surgeons with a SoMe presence are truly active users. Although other fields such as the fashion, technology and music industries have shown an exponential increase in SoMe over the last 5 years, this is likely due to the ease of digitization of these arenas. The medical field can never be made fully digital as human contact is primordial in patient-physician relationships, potentially explaining this divergence. As also appreciated in Table 1, those with just a professional account had the most active (posting at least once a day) usage (16%), followed by those with a mixed personal and professional account. Pre and post-operative photos, education and injections were most frequently the topic of posts for both those with a mixed personal-professional account and those with a strictly professional account. Interestingly, the group with mixed personal-professional accounts was the only one to report members with more than 10,000 followers.

Table 2 summarizes the perception and ethics data collected in our survey. There seems to be diverging views regarding the benefits and ethics in regard to SoMe. Thirty-five percent agreed that refusing to discuss surgery with patients over SoMe would decrease their number of patients, however 45% disagreed with the fact that it would be ethical to discuss procedures with patients over SoMe. As also appreciated in Table 2, surgeons without a professional account were more likely to believe it is unethical to discuss procedures with patients over SoMe (71% vs. 29%) and to believe it is unethical to post procedural/intra-operative videos on SoMe (75% vs. 21%). This is interesting given that surgeons without a professional account were also more likely to have an academic portion to their practice (100%) as compared to those with a professional account (68%). Similarly, Economides et al. report that academic surgeons are more likely to believe SoMe worsens the image of the field, and are less likely to maintain an active professional SoMe account. Respondents with no professional account seemed to disagree that having SoMe would increase their patient base. This is probably a reflection of the fact that surgeons without a professional account were more often academics surgeons, and thus do not rely on SoMe to attract patients.

The authors recognize the limitation in this study’s generalizability due to the low response rate, albeit consistent with other web-based surveys regarding SoMe among plastic surgeons. The authors acknowledge that certain factors
Table 1  Answers to questions pertaining to Social Media usage, stratified by type of Social Media account.

| What is your preferred social media platform for posting work-related activities?* | Overall | Just a professional account | One account for both professional and personal | Just a personal account | Separate professional and personal accounts | No account |
|---|---|---|---|---|---|---|
| | N | n | n | n | n | n |
| Facebook | 27 | 30% | 7 | 35% | 16 | 38% | 2 | 12% | 2 | 40% | 0 | 0% |
| Instagram | 33 | 36% | 8 | 40% | 21 | 50% | 2 | 12% | 2 | 40% | 0 | 0% |
| Snapchat | 5 | 5% | 3 | 15% | 2 | 5% | 0 | 0% | 0 | 0% | 0 | 0% |
| Twitter | 3 | 3% | 1 | 5% | 2 | 5% | 0 | 0% | 0 | 0% | 0 | 0% |
| Other | 3 | 3% | 0 | 0% | 1 | 2% | 2 | 12% | 0 | 0% | 0 | 0% |
| I don’t | 10 | 11% | 0 | 0% | 0 | 0% | 8 | 47% | 1 | 20% | 1 | 14% |
| No answer | 10 | 11% | 1 | 5% | 0 | 0% | 3 | 18% | 0 | 0% | 6 | 86% |
| Total | 91 | 10% | 1 | 100% | 1 | 100% | 1 | 100% | 1 | 100% | 1 | 100% |

How frequently do you post work-related content on this most preferred platform?

| | < 1 per week | 1 per week | 1-5 per week | 1 per day | > 1 per day | Never | Total |
|---|---|---|---|---|---|---|---|
| N | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| n | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| < 1 per week | 18 | 29% | 6 | 50% | 7 | 30% | 5 | 29% | 0 | 0% | 0 | 0% |
| 1 per week | 4 | 6% | 0 | 0% | 4 | 17% | 0 | 0% | 0 | 0% | 0 | 0% |
| 1-5 per week | 15 | 24% | 4 | 33% | 9 | 39% | 0 | 0% | 2 | 67% | 0 | 0% |
| 1 per day | 2 | 3% | 1 | 8% | 1 | 4% | 0 | 0% | 0 | 0% | 0 | 0% |
| > 1 per day | 3 | 5% | 1 | 8% | 2 | 9% | 0 | 0% | 0 | 0% | 0 | 0% |
| Never | 20 | 32% | 0 | 0% | 0 | 0% | 12 | 71% | 1 | 33% | 7 | 100% |
| Total | 62 | 12% | 20 | 30% | 23 | 30% | 17 | 24% | 3 | 39% | 7 | 39% |

What area of plastic surgery do you post most about?

| | esthetic | Hand | Craniofacial | Microsurgery | None | Pediatric | Education | Division academic activities | Non-surgical | No answer | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 34 | 55% | 12 | 100% | 21 | 91% | 0 | 0% | 1 | 33% | 0 | 0% |
| | 2 | 3% | 0 | 0% | 0 | 0% | 2 | 12% | 0 | 0% | 0 | 0% |
| | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 20 | 32% | 0 | 0% | 0 | 0% | 12 | 71% | 1 | 33% | 7 | 100% |
| | 2 | 2% | 0 | 0% | 0 | 0% | 1 | 6% | 0 | 0% | 0 | 0% |
| | 1 | 1% | 0 | 0% | 0 | 0% | 1 | 4% | 0 | 0% | 0 | 0% |
| | 1 | 1% | 0 | 0% | 0 | 0% | 1 | 4% | 0 | 0% | 0 | 0% |
| | 1 | 1% | 0 | 0% | 0 | 0% | 1 | 4% | 0 | 0% | 0 | 0% |
| | 1 | 1% | 0 | 0% | 0 | 0% | 1 | 4% | 0 | 0% | 0 | 0% |
| | 1 | 1% | 0 | 0% | 0 | 0% | 2 | 12% | 0 | 0% | 0 | 0% |
| | 62 | 12% | 12 | 20% | 23 | 30% | 17 | 24% | 3 | 39% | 7 | 39% |

What do you most commonly post about? *

| | Clinical encounters | Intraoperative | Pre and post-operative | Education | Live feed | Injections | Research | Personal life | No answer |
|---|---|---|---|---|---|---|---|---|---|
| | 7 | 6% | 3 | 12% | 4 | 6% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 8 | 7% | 2 | 8% | 6 | 9% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 21 | 18% | 7 | 28% | 14 | 22% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 24 | 21% | 7 | 28% | 14 | 22% | 1 | 6% | 2 | 67% | 0 | 0% |
| | 8 | 7% | 1 | 4% | 7 | 11% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 12 | 10% | 3 | 12% | 9 | 14% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 7 | 6% | 2 | 8% | 5 | 8% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 14 | 12% | 0 | 0% | 0 | 0% | 6 | 9% | 8 | 47% | 0 | 0% |
| | 16 | 14% | 0 | 0% | 0 | 0% | 0 | 0% | 8 | 47% | 1 | 33% |
| | 117 | 25% | 20% | 25% | 20% | 25% | 20% | 25% | 20% | 25% | 20% | 25% |

How many followers do you have? (total of all platforms)

| | <100 | 100-1000 | 1000-10,000 | >10,000 | No answer | Total |
|---|---|---|---|---|---|---|
| | 19 | 31% | 3 | 25% | 5 | 22% | 11 | 65% | 0 | 0% | 0 | 0% |
| | 16 | 26% | 4 | 33% | 7 | 30% | 3 | 18% | 2 | 67% | 0 | 0% |
| | 14 | 23% | 5 | 42% | 9 | 39% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 2 | 3% | 0 | 0% | 2 | 9% | 0 | 0% | 0 | 0% | 0 | 0% |
| | 11 | 18% | 0 | 0% | 0 | 0% | 3 | 18% | 1 | 33% | 7 | 100% |
| | 62 | 12% | 23 | 17 | 3 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |

*Multiple answers could be selected.
| Do you feel that social media presence attracts patients? | Overall | Just a professional account | One account for both professional and personal | Just a personal account | Separate personal and professional accounts | No account |
|----------------------------------------------------------|---------|-----------------------------|-----------------------------------------------|------------------------|---------------------------------------------|-----------|
| Strongly Agree                                           | 15      | 24%                         | 50%                                           | 8                     | 35%                                         | 6%        |
| Agree                                                    | 18      | 29%                         | 17%                                           | 9                     | 39%                                         | 5%        |
| Neutral                                                  | 28      | 45%                         | 33%                                           | 6                     | 26%                                         | 10%       |
| Disagree                                                 | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Strongly Disagree                                        | 1       | 2%                          | 0%                                            | 0                     | 0%                                          | 1%        |
| Only with patient consent                                | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Only minor procedures                                    | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Total n                                                  | 62      | 12                          | 23                                            | 17                    | 3                                           | 7         |

| Do you feel that not having social media will decrease your number of patients? | Overall | Just a professional account | One account for both professional and personal | Just a personal account | Separate personal and professional accounts | No account |
|-----------------------------------------------------------------------------|---------|-----------------------------|-----------------------------------------------|------------------------|---------------------------------------------|-----------|
| Strongly Agree                                                             | 14      | 23%                         | 58%                                           | 6                     | 26%                                         | 1%        |
| Agree                                                                      | 20      | 32%                         | 42%                                           | 12                    | 52%                                         | 1%        |
| Neutral                                                                    | 15      | 24%                         | 0%                                            | 3                     | 13%                                         | 7%        |
| Disagree                                                                   | 6       | 10%                         | 0%                                            | 2                     | 9%                                         | 3%        |
| Strongly Disagree                                                          | 7       | 11%                         | 0%                                            | 0                     | 0%                                          | 5%        |
| Only with patient consent                                                  | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Only minor procedures                                                      | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Total n                                                                    | 62      | 12                          | 23                                            | 17                    | 3                                           | 7         |

| Do you feel that refusing to discuss surgery with patients over social media platforms will decrease your number of patients? | Overall | Just a professional account | One account for both professional and personal | Just a personal account | Separate personal and professional accounts | No account |
|--------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------|-----------------------------------------------|------------------------|---------------------------------------------|-----------|
| Strongly Agree                                                            | 10      | 16%                         | 4%                                            | 5                     | 22%                                         | 1%        |
| Agree                                                                      | 12      | 19%                         | 2%                                            | 6                     | 26%                                         | 2%        |
| Neutral                                                                    | 18      | 29%                         | 17%                                           | 5                     | 22%                                         | 6%        |
| Disagree                                                                   | 14      | 23%                         | 2%                                            | 17                   | 6%                                          | 2%        |
| Strongly Disagree                                                          | 8       | 13%                         | 2%                                            | 17                   | 4%                                          | 4%        |
| Only with patient consent                                                  | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Only minor procedures                                                      | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Total n                                                                    | 62      | 12                          | 23                                            | 17                    | 3                                           | 7         |

| Do you feel it is ethical to discuss procedures with patients over social media? | Overall | Just a professional account | One account for both professional and personal | Just a personal account | Separate personal and professional accounts | No account |
|-----------------------------------------------------------------------------|---------|-----------------------------|-----------------------------------------------|------------------------|---------------------------------------------|-----------|
| Strongly Agree                                                             | 7       | 11%                         | 2%                                            | 5                     | 22%                                         | 0%        |
| Agree                                                                      | 11      | 18%                         | 2%                                            | 6                     | 26%                                         | 2%        |
| Neutral                                                                    | 16      | 26%                         | 4%                                            | 5                     | 22%                                         | 4%        |
| Disagree                                                                   | 11      | 18%                         | 0%                                            | 5                     | 22%                                         | 5%        |
| Strongly Disagree                                                          | 17      | 27%                         | 4%                                            | 33                   | 9%                                          | 6%        |
| Only with patient consent                                                  | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Only minor procedures                                                      | 0       | 0%                          | 0%                                            | 0                     | 0%                                          | 0%        |
| Total n                                                                    | 62      | 12                          | 23                                            | 17                    | 3                                           | 7         |

| Do you feel that is ethical to post procedural/intraoperative videos on Social Media? | Overall | Just a professional account | One account for both professional and personal | Just a personal account | Separate personal and professional accounts | No account |
|-----------------------------------------------------------------------------|---------|-----------------------------|-----------------------------------------------|------------------------|---------------------------------------------|-----------|
| Strongly Agree                                                             | 6       | 10%                         | 2%                                            | 17                   | 4%                                          | 17%       |
| Agree                                                                      | 13      | 21%                         | 4%                                            | 8                     | 33%                                         | 8%        |
| Neutral                                                                    | 11      | 18%                         | 1%                                            | 8                     | 3%                                          | 3%        |
| Disagree                                                                   | 6       | 10%                         | 0%                                            | 2                     | 9%                                          | 2%        |
| Strongly Disagree                                                          | 20      | 32%                         | 3%                                            | 25                   | 2%                                          | 9%        |
| Only with patient consent                                                  | 5       | 8%                          | 1%                                            | 8                     | 4%                                          | 17%       |
| Only minor procedures                                                      | 1       | 2%                          | 1%                                            | 8                     | 0%                                          | 0%        |
| Total n                                                                    | 62      | 12                          | 23                                            | 17                    | 3                                           | 7         |
such as working environment (large academic urban center vs. smaller community practice) and relative paucity of active academic SoMe usage may also render some of the data presented less generalizable. Finally, the possibility for statistical analyses were limited given the low number of responses, and were thus not conducted.

This is the first survey to analyze the perception and ethics of SoMe usage among Canadian plastic surgeons. The results demonstrate that although most are familiar with SoMe, the ethics and perceptions surrounding aspects of its usage are still debatable and may be influenceable by the types of accounts. There is also more room for surgeons, including academics, to expand the reach of SoMe in plastic surgery.

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None declared

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Responsibilities for the future reduction of carbon footprint in plastic surgery

Dear Sir,

Climate change is a global threat, and its significance means that no practicing healthcare professionals can remain as passive bystanders. Every practitioner needs to urgently reflect on their own practice to determine how to balance the delivery of high-quality care with efforts to reduce their carbon footprint.

The health-care sector is responsible for 4-5% of global greenhouse gas emissions and holds a key role in climate change mitigation efforts. A recent assessment of NHS England carbon footprint reported that emissions totalled 25 megatons of carbon dioxide equivalent in 2019 with 62% coming from supply chain, 24% from direct delivery of care, 10% from staff and patient travel and 4% from services commissioned by the NHS.

Surgical activity is a resource-intensive sub-sector of healthcare with appreciable energy demands and waste generation. A comparative study of carbon footprinting in operating theatres in three health systems found that theatres were 3 to 6 times more energy—intense than the hospital as a whole.

There is limited literature on carbon footprinting in plastic surgery. The environmental impact of the specialty on a nationwide level has not been analysed. Despite this, plastic surgery patients are highly informed about the procedures they seek, and are very engaged with discussion forums, and discerning in their selection of clinicians who provide care. There is no doubt that the carbon footprint of procedures, and how these differ between practices will become a factor patients consider before deciding on their treatment and provider.

Fig. 1.

Brown et al. identified 4 domains where plastic surgeons can reduce their carbon footprint: material, energy, technique and dissemination. Based on these 4 domains and our previous experience with remote consultations in burns, we hereby present our perception of the responsibilities
of Plastic Surgery to reduce its carbon footprint in the future.6

Reduction of carbon footprint in Plastic Surgery can happen at a clinic, ward, operating room and education level:

Clinic

COVID-19 has been the main driving force of remote consultations for follow-up burns patients. We have previously demonstrated the effectiveness and role of remote consultations in burns patients.5 This has the benefit of reducing patient and staff commute as well as use of disposable equipment during clinic review. Further studies are needed to quantify the reduction in carbon dioxide emissions and medical waste products for every plastic surgery clinic review.

‘Green Plastic’ clinic review sets can be used to reduce waste production. This has been demonstrated by Thiel et al. in the setting of the operating room. We believe this to be equally transferrable to the clinic setting with potential environmental benefits.

Ward

Plastic Surgery wards are resource heavy with extensive use of dressings, bandages, drains and disposable surgical equipment. Preparation of ‘Green Plastic’ sets for dressing changes and minor operations can decrease consumable waste. This has been demonstrated by Thiel et al. in the operating room, however, studies quantifying the volume of consumables used on a Plastic Surgery ward are not available. We suggest that unused material on Plastic Surgery be recycled or donated to simulation activities or healthcare charity organisations.

Operating room

Operating rooms utilize a significant amount of energy as they accommodate energy intensive activities such as lighting, temperature control, laminar air flow and use of surgical and non-surgical equipment. Our specialty can lead in developing operating theatres with environmentally sustainable principles at core. For example, advocating for ‘G-PLOTs’ (Green-Plastic Operating Theatres) can be achieved by simple measures: encouraging installation of timers, motion detectors and LED lights and handling theater waste following the principles of 3Rs - recycling, reproducing, and reducing.

Plastic Surgeons need to incorporate the carbon footprint of each procedure in the decision tree for each patient management. We do not suggest prioritizing carbon footprint over patient safety, nevertheless, if the specialty develops an index of carbon footprint for each procedure, this can be discussed with the patient to reach a greener surgical option. Furthermore, hand surgeons must encourage wake-awake-local-anesthesia-no-tourniquet (WALANT) where appropriate and reduce the use of general anesthesia. Finally, the use of absorbable suture material reduces patient visits to clinic or general practice, however, it is difficult to determine whether this has an overall positive environmental impact as carbon footprint of an absorbable suture procurement is currently not defined.7
Education & training

There has been an exponential increase in the number and quality of webinars and online training materials due to restrictions implemented to reduce interactions and travel during the COVID-19 pandemic, which can be further developed to reduce the carbon footprint of training and education.

Annual specialty conferences, albeit unique opportunities for networking and face-to-face discussion, can have a significant environmental impact; flights, hotel stays, utilization of merchandise and plastic waste. Zotova et al. recently proposed a new model for international conferences that focuses on 7 key interventions for a sustainable and carbon-neutral medical event.5 As evident from the COVID-19 pandemic, annual conferences can take the form of hybrid meetings with virtual and video conference options. This can be further developed if the specialty supports augmented or virtual reality options for conference attendance. In this way, faculty and participants can reduce air travelling which is the single most effective intervention to reduce individual participant carbon footprint.8

Plastic surgery is a specialty of knowledge, skill, and innovation, combining accurate assessment of need with basic principles and imaginative skill. These qualities underline the need to directly address the issues of our Carbon footprint and find solutions so that we adopt green plastic surgery and help create a sustainable future.

Conflict of Interest and funding statements

I confirm that there are no conflicts of interest and there is no source of funding regarding the manuscript ‘Responsibilities for the future reduction of health care carbon footprint in Plastic Surgery’

Ethical approval

N/A

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