Plastic Surgery in Israel: From Wartime Readiness to Elective Excellence

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ABSTRACT Plastic and reconstructive surgery is a specialty that has an important place in the surgical field. Plastic surgeons cooperate with all surgical disciplines to solve complex multidisciplinary surgical cases. This issue of the *Israel Medical Association Journal* (*IMAJ*) covers some of the groundbreaking treatments being performed by plastic surgeons in Israel. The articles show the wide and complex range of issues where plastic surgery is needed, including hospital-based breast reconstructions, oncologic resections, and innovative lymphedema surgery, as well as aesthetic procedures. The efforts of plastic surgeons have been especially highlighted due to the Iron Swords war, which started on 7 October 2023. Injuries included complex burns and amputations that required attention under fire. In addition, advances were achieved through cutting-edge reconstructive microsurgical traumatic solutions. Together, these articles highlight how Israeli teams have leveraged experience in trauma, high-volume civilian and military caseloads and innovative inspirations that have generated knowledge that may be broadly applicable to surgeons worldwide.

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Plastic surgery is a unique specialty. Although small in faculty members, it entails a vast field of procedures ranging from pediatric congenital defects repair, oncologic resections, organ reconstruction (e.g., nose, face, ears, breasts), limb salvage, transplantations, microsurgery, wound care, and more. Plastic surgeons participate in all surgical multidisciplinary teams and work alongside general, orthopedic, thoracic, ophthalmic, urologic, neurosurgeons, and other surgeons in the care of the most complex of cases. We also consult internal medicine professionals and contribute to hospital trauma teams. In addition to the reconstructive work, plastic surgeons perform all aesthetic procedures, surgical as well as those that are minimally invasive. The past few years have been particularly challenging for our specialty due to the overwhelming number of war-injured patients who require wound care and reconstruction of function and form. In this issue of *Israel Medical Association Journal* (*IMAJ*), we present studies conducted in both academic and private practice settings.

Held scarcely a year after the start of the Iron Swords war on 7 October 2023, the Annual Meeting of the Israeli Society of Plastic Surgeons drew over 50 presentations covering five pillars: wartime damage-control surgery, complex free flap reconstruction, aesthetic innovation, super-microsurgery, and artificial-intelligence decision tools. The review by Tepper et al. [1] showcased how Israeli plastic surgeons blend front-line experience with artificial intelligence-driven precision to advance global practice even in conflict-stricken times [1]. Haik and his colleagues [2] recounted the treatment of a young family who sustained 30–62 % total body-surface area burns when terrorists set their home ablaze on 7 October 2023. Bromelain-based selective enzymatic debridement (NexoBrid®) was applied to burns, sparing surgery and shortening hospitalization. The authors proposed that wide-field NexoBrid® can be lifesaving in mass-casualty settings and should be integrated into Israel's disaster protocols [2].

Sepsis is one of the most severe co-morbidities in burn patients and a leading cause of mortality. Looking into sepsis in adult burns, Pikkel and colleagues [3] presented a 10-year review of 58 patients with over 20% total body-surface area (TBSA) burns. They noted sepsis in 30 patients, all with TBSA above 40% and a sepsis mortality rate of 43%. Scald burns never progressed to sep-

sis, whereas flame injuries were dominant in this respect. The authors recommended routine liver-function surveillance, judicious ventilation, and selective antibiotic prophylaxis for ventilated patients or those with TBSA higher than 40% to curb sepsis risk [3].

Wound reconstruction takes a massive part of our scope, and complex wounds following burns, trauma and oncologic resections require complex reconstruction. There are usually several reconstructive options, and every case is managed according to a patient's medical history and type of injury, opting for the most suitable solution. Reconstruction may range from a simple procedure under local anesthesia (e.g., application of skin grafts) to complex microsurgical procedures (e.g., free flaps). Maisel Lotan and co-authors [4] presented a study of patients with complex traumatic distal lower-limb defects exposing bone or tendons who were successfully reconstructed with dermal substitutes and split-thickness grafts, thus avoiding more complex surgery that threatened donor site morbidity and prolonged hospitalization. The study series underscores that off-the-shelf matrices can obviate microsurgical free flaps in frail or comorbid patients while delivering a reliable contour and minimal donor-site morbidity [4].

Another reconstructive challenge is the scalp. Small defects of exposed bone may be covered by local tissue rearrangement, but larger defects need more complex reconstructive solutions. With the aim of standardizing scalp reconstruction following oncologic excisions, Shachar et al. [5] created an algorithm according to defect type and size. The authors revisited the legacy of the 1950s scalp irradiation of over 20,000 Israeli children for the treatment of tinea capitis (scalp ringworm) and its modern fallout of radiation-induced scalp cancers [5].

In a second article looking into scalp reconstruction, Hadad and colleagues [6] described a one-stage axial fasciocutaneous flap that incorporated both supratrochlear and supraorbital vessels through a deliberately broad pedicle for coverage of large scalp defects. This new technique may replace complex free flap or multi-stage surgery to cover scalp defects after large oncologic resections [6].

Another important aspect of our field is the excision of skin lesions, mainly skin carcinomas. Merkel cell carcinoma is an under-diagnosed potentially lethal skin cancer. A retrospective review of 17 Merkel cell patients managed at Shaare Zedek Medical Center (2015–2022) found lymph-node involvement in 29% and distant metastasis in 23% at diagnosis. Early biopsy of atypical crimson nodules is essential for detection in a population that presents nearly a decade younger than Western averages of skin carcinomas [7].

Breast reconstruction represents a significant part of the plastic surgery workload due to the high incidence of breast cancer, the most common cancer in women. Mastectomy is part of the surgical treatment algorithm of 40% of patients, and most women will choose to undergo immediate breast reconstruction. Breast reconstruction after mastectomy may be based on silicone implants, covering about 80% of reconstructions, or autologous reconstruction (free flap from the patient's own tissues), which provides treatment mostly for delayed or failed reconstructions.

Autologous breast reconstruction has excellent and natural aesthetic results and avoids silicone implants, but the procedure entails more difficult recovery and donor site morbidity. In addition, it must be performed by fellowship-trained plastic-microsurgeons. A review of 102 DIEP flaps in 70 women between 2013–2024 is the largest series performed by a single Israeli plastic surgeon (HK) based on private practices. The authors reported a total flap-loss rate of 3.9%. Outcomes mirrored those published by Israel's tertiary centers, demonstrating that meticulous protocols and a trained nursing staff can safely translate complex microsurgery into the private sector, providing patients with shorter waits and more personalized care [8].

One of the common co-morbidities of breast oncologic surgery is lymphedema. In a 3-year follow up of 105 women after breast conserving surgery (BCS), overall breast-edema prevalence was 7.6%. Kedar and co-authors called [9] for routine indocyanine-green lymphography to enable earlier intervention with conservative measures and lymphatic reconstructive surgery. Retchkiman et al. [10] investigated breast reconstruction rates in the Bedouin population. Bedouin women chose reconstruction after mastectomy at rates statistically indistinguishable from their non-Bedouin peers. These findings highlight the egalitarian impact of Israel's universal healthcare coverage even in seminomadic communities [10].

Another possible co-morbidity after mastectomy and reconstruction is expanding hematoma. Adawi and co-authors [11] presented a case of bilateral expanding hematoma and hypovolemic shock following skin-sparing mastectomy and reconstruction in a 60-year-old woman on chronic escitalopram therapy. After a review of the literature, the authors noted up to a fourfold rise in bleeding events among selective serotonin reuptake

inhibitors users in breast and aesthetic surgery and advocated pre-operative counselling, peri-operative hemostatic strategies, and development of formal guidelines for this growing patient cohort.

Last, Wolf et al. [12] reviewed 726 abdominoplasties, of which 15% were combined with elective breast surgery. Combined surgery showed no increase in complications. The data supported offering a single-stage torso rejuvenation without compromising on safety or outcomes to well-selected postpartum patients [12].

CONCLUSIONS

This issue of *IMAJ* shows how plastic surgery is a constantly evolving specialty and one of the most creative and innovative professions in modern medicine. Advances in technology allow for change and improvement in surgical techniques and outcomes from both functional and aesthetic perspectives. Since there is usually no single surgical solution, plastic surgeons constantly strive to develop new surgical techniques to improve results, using less invasive methods with superior, safer, and longer-lasting results.

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Capsule

Association between HLA genetics and SARS-CoV-2 infection in a large real-world cohort

Genetic variation in the human leukocyte antigen (HLA) region is thought to influence susceptibility to and severity of a variety of infectious diseases. Several studies have explored a possible relationship between HLA genetics and SARS-CoV-2 infection, although mixed results, small sample sizes, and difficulty controlling exposure risk have made it difficult to draw firm conclusions. A dataset of 419,234 subjects with HLA genotype data and COVID-19 PCR test results was studied by **Letovsky** and colleagues. A baseline analysis was performed to examine the association of non-HLA factors on COVID-19 positivity. Then, multivariate logistic regressions, incorporating single and paired HLA alleles, were performed and then corrected for significant factors from the baseline analysis. Proxies for socioeconomic status and exposure risk were significantly associated with COVID-19 positivity across all ancestry groups studied. Forty-one single HLA alleles displayed significant association with COVID-19 positivity; after controlling for socioeconomic status and exposure risk, only eight significant associations remained. In addition, two HLA allele pairs were associated with test positivity after correction. Of all variables, socioeconomic status showed the greatest effect size. The results from this study suggest that many, if not all, of the reported associations between HLA alleles and SARS-CoV-2 infection may be spurious, owing to confounding factors.

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