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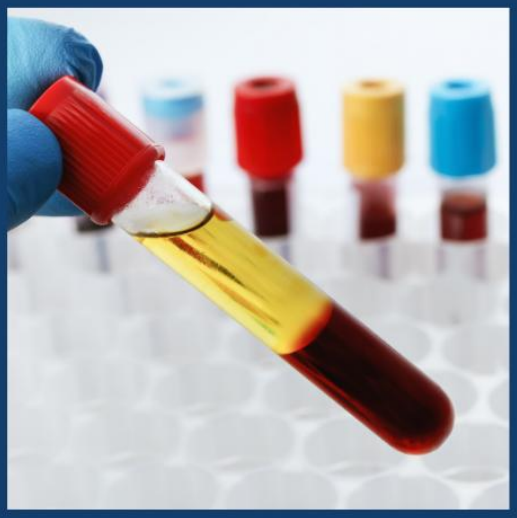

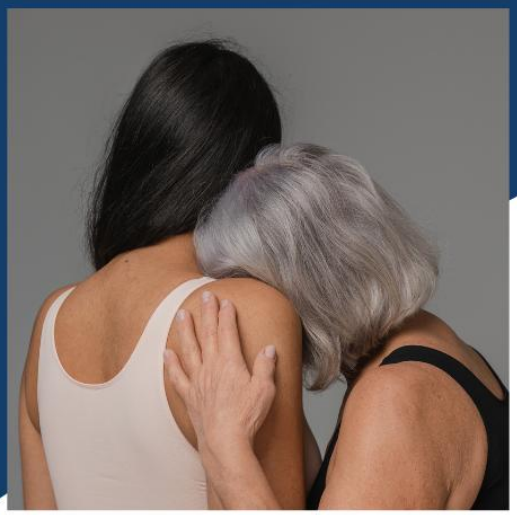

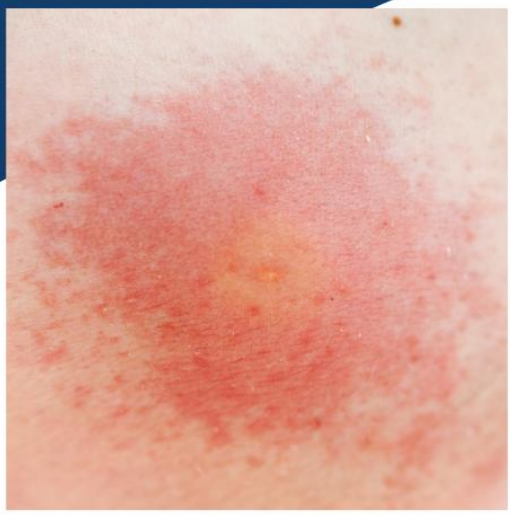

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The Cosmetic Physician

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The Cosmetic Physician

Letter from the Editor

Cosmetic medicine as part of contemporary healthcare, involves the practice of science, artistry, ethics, legislation, and patient psychology. *The Cosmetic Physician* offers an authoritative Journal representing the full breadth of this discipline. Our mission extends beyond clinical and procedural knowledge and includes the complex system in which cosmetic medicine is practised.

The term 'cosmetic' originates from the ancient Greek word kosmos, signifying a harmonious and beautifully organised system. This etymology is fitting, as it reflects the essence of cosmetic medicine - not merely the enhancement of appearance, but the restoration and preservation of balance, proportion, and confidence within the individual. True excellence in this field requires more than technical proficiency; it demands an appreciation of the relationship between physical form, emotional wellbeing, and societal context.

The Journal is committed to presenting evidence-based medical information across all aspects of Cosmetic Practice. Advances in injectables, energy-based devices, dermatological therapies, and non-surgical adjuncts are explored alongside critical discussions of safety, efficacy, and patient selection. Equally, we acknowledge that clinical practice does not occur in isolation. Legislative frameworks and regulatory standards continue to evolve in response to technological progress, safety concerns, and public expectation. By providing current insights into these developments, the Journal supports practitioners with ensuring compliance while maintaining the highest standards of care.

Medicolegal factors of consent, risk disclosure, professional accountability, and documentation are central to ethical practice. The Journal encourages scholarly articles to foster a transparent culture, raising awareness of practitioners to protect both their patients and their professional integrity.

Importantly, cosmetic practitioners must consider psychological factors when accepting and treating clients. Patients present not only with aesthetic concerns but with personal narratives shaped by identity, self-perception, and social influence. Understanding motivation, managing expectations, and recognising vulnerability are critical competencies. The Journal therefore places strong emphasis on the psychological aspects of care, encouraging practitioners to adopt a holistic, patient-centred approach that prioritises wellbeing over intervention.

Cosmetic practitioners have a responsibility to uphold ethical principles. Commercial pressures, social media influence, and shifting cultural ideals can challenge clinical judgement. In this context, *The Cosmetic Physician* encourages articles that guide and safeguard—promoting integrity, critical thinking, and adherence to best practice.

Ultimately, our aspiration is clear. The Journal exists to educate and inform, to advance knowledge, and to support clinicians in delivering care that is not only effective, but ethical and safe. In doing so, we honour the true meaning of kosmos: striving toward a practice that is balanced, responsible, and harmoniously organised in service to our patients.

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Editor

Beyond Platelet Concentration: Dose-Dependent Biogenesis in Aesthetic Medicine Using High-Dose, Mononuclear Cell-Rich Platelet-Rich Plasma

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Abstract

Platelet-rich plasma (PRP) is widely utilised in aesthetic medicine; however, variability in preparation systems has resulted in inconsistent clinical outcomes and ambiguity in the literature. A central limitation is the failure to distinguish between low-dose PRP systems, commonly derived from single-spin tube methods, and high-dose preparations capable of delivering ≥10 billion platelets per 7mL. This manuscript evaluates the biological and clinical relevance of platelet concentration and dose, cellular composition, and PRP classification using the DEPA (Dose of injected platelets, Efficiency of production, Purity of the PRP, Activation of the PRP) framework. Evidence from Devereaux, et al., (1), including fibroblast proliferation, wound scratch migration assays, and extracellular matrix (ECM) gene expression profiling, demonstrates a clear dose-dependent regenerative response. Clinical studies, including Bansal, et al., (2) and Baria, et al., (3), further support the importance of total platelet dose in achieving sustained outcomes. High-dose, leucocyte-rich PRP (LR-PRP), consistent with DEPA AAA classification, facilitates coordinated stromal–immune signalling and tissue remodelling. In contrast, low-dose PRP preparations may not reach biologically relevant thresholds. A shift from "biostimulation" to "biogenesis" is proposed to more accurately reflect the systems-level regenerative effects associated with adequately dosed PRP.

Introduction

Platelet rich plasma (PRP) has become an established adjunct in aesthetic medicine, applied across indications including skin ageing, alopecia, and scar modulation. Despite its widespread adoption, clinical outcomes remain variable. This variability is frequently attributed to differences in technique; however, increasing evidence suggests that the primary determinant is the biological quality of the PRP preparation itself.

PRP has historically been defined as plasma with platelet concentrations above baseline. While technically accurate, this definition does not account for total platelet dose, cellular composition, or production efficiency. The DEPA (Dose of injected platelets, Efficiency of production, Purity of the PRP, Activation of the PRP) classification, a structured approach to PRP evaluation, was introduced to address these limitations by incorporating dose, efficiency, purity, and activation into PRP characterisation. Within the DEPA framework, the first letter refers to the total injected platelet dose, the second to the efficiency of platelet recovery during preparation, and the third to the purity of the final PRP product, particularly the relative absence of red blood cells and granulocytes. An AAA classification therefore represents the highest category across these parameters, indicating a high injected platelet dose, efficient platelet recovery, and a highly purified PRP preparation. In practical terms, AAA-classified PRP is biologically distinct from low-dose or poorly recovered preparations, as it reflects both the quantity of platelets delivered and the quality of the cellular product. High-dose preparations with efficient platelet recovery and minimal contamination align with the highest classification levels. Application of this framework enables clinicians to differentiate between biologically distinct PRP systems and supports evidence-based practice (4, 5). A significant issue in clinical practice is the widespread use of low-dose PRP derived from single-spin tube systems. These preparations often deliver less than 1 billion platelets per 5 mL, resulting in reduced biological activity. In contrast, high-dose systems capable of delivering ≥10 billion platelets per 7 mL include both platelets and mononuclear cells, providing a more complete regenerative substrate (1).

A useful perspective is to recognise that many of the target tissues in aesthetic medicine share structural and biological characteristics with musculoskeletal tissues. Adipose compartments, retaining ligaments, fascia/SMAS (superficial musculoaponeurotic system), and skeletal muscle are all connective tissue systems governed by similar extracellular matrix dynamics, cellular signalling pathways, and mechanotransduction processes. Accordingly, evidence from orthopaedic

and musculoskeletal PRP studies; particularly those demonstrating dose-dependent effects may be translated to the integumentary system, as the underlying regenerative mechanisms are conserved across these tissues (2, 6, 7).

This manuscript examines the biological and clinical implications of this distinction and proposes a reframing of PRP therapy as a dose-dependent regenerative intervention.

Platelet Dose as the Determinant of Biological Activity

The biological effects of PRP are intrinsically dose-dependent. Experimental studies have demonstrated that platelet concentrations approaching 1 × 106 platelets/µL stimulate mesenchymal stem cell mitogenesis and cellular proliferation (8). However, concentration alone does not define therapeutic efficacy. Total platelet and mononuclear cell dose, calculated as the product of platelet concentration and injected volume, determines the quantity of bioactive molecules delivered to tissue. The DEPA classification highlights substantial variability between systems, with reported doses ranging from 0.21 billion platelets per 5 mL to just over 10 billion platelets per 7 mL in many commonly used devices (5).

Clinical evidence now supports the relevance of higher dosing. Bansal, et al., (2) Patel, et al., (6) Berrigan, et al., (7) demonstrated that a standardised dose of approximately 10 billion platelets in 5-7 mL resulted in sustained clinical improvement in orthopaedic applications. The studies emphasised that absolute platelet dose, rather than concentration alone, was critical to long-term efficacy. Similarly, Baria, et al., (3) reported outcomes using PRP preparations with a mean dose of approximately 13.7 billion platelets in 5-7 mL, demonstrating sustained improvement in musculoskeletal conditions at 12 months follow-up. These findings reinforce a dose-response relationship in clinical practice and suggest that regenerative effects are contingent on achieving a sufficient biological threshold.

In contrast, low-dose tube PRP systems, often delivering less than 1-2 billion platelets per 5 mL, are unlikely to reach this threshold (9). Bennell, et al., (10) demonstrated that many such systems produce only modest increases above baseline platelet counts, raising questions regarding their capacity to induce meaningful tissue regeneration.

Cellular Composition and Immuno-Regenerative Effects

In addition to platelet dose, cellular composition is a critical determinant of PRP efficacy. Leucocyte-rich PRP (LR-PRP) contains mononuclear cells, including monocytes and lymphocytes, which contribute to immune modulation and tissue repair. Devereaux, et al., (1) demonstrated that LR-PRP significantly enhanced fibroblast proliferation and migration of impaired fibroblasts compared to platelet-poor plasma controls. Platelet concentrations, in this study, reached approximately 1.42 × 106 platelets/µL in 7 mL volume, approximating 10 billion platelets per 7 mL and accompanied by 300% elevated white blood cell counts, supporting a biologically high dose LR-PRP sample. The scratch-wound assay provides a clear illustration of this effect. The scratch-wound assay is a simple, reproducible assay commonly used to measure basic cell migration parameters such as speed, persistence, and polarity. Impaired fibroblast cells are grown to confluence and a thin "wound" introduced by scratching with a pipette tip. After dosing with LR-PRP and LP-PPP, cells at the wound edge polarise and migrate into the wound space (11). In this experiment, at 48 hours, LR-PRP-treated fibroblasts achieved complete wound closure, whereas leucocyte poor, platelet poor plasma (LP-PPP) and the negative control demonstrated partial closure only.

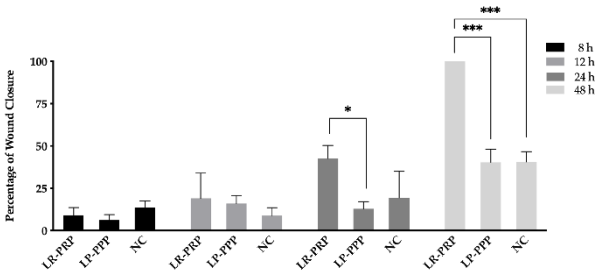

Figure 1. Scratch-wound assay demonstrating fibroblast migration following treatment with leucocyte-rich platelet-rich plasma (LR-PRP) compared to leucocyte-poor platelet-poor plasma (LP-PPP). LR-PRP achieved complete wound closure at 48 hours, indicating enhanced cellular migration and regenerative activity (adapted from Devereaux, et al., (1)). The presence of mononuclear cells facilitates macrophage polarisation towards a reparative phenotype, contributing to immune

regulation and sustained tissue remodelling. These processes are diminished in leucocyte-poor preparations.

In addition to platelet dose and concentration, LR-PRP should also be understood as a dynamic extracellular vesicle-generating biologic. Platelets release platelet-derived exosomes, while monocytes and lymphocytes contribute additional immune-cell-derived exosomes that participate in paracrine signalling, immune regulation, angiogenesis, fibroblast activation, and extracellular matrix remodelling. This is clinically important because exosome release from living cellular components occurs continuously over time, rather than as a fixed bottled dose. The cumulative extracellular vesicle output from a high-dose, LR-PRP preparation therefore exceeds the commercially promoted quantities contained in isolated “5 billion” or “10 billion” exosome vials (12). Unlike bottled exosome products, which represent a static and commercially standardised dose, biologically intact PRP provides both the cellular source and the regenerative microenvironment required for ongoing platelet-derived, monocyte-derived, and lymphocyte-derived exosome signalling. This further supports the concept that high-dose LR-PRP is not simply a growth factor treatment, but a living, systems-level regenerative intervention (13,14).

Extracellular Matrix Remodelling and Gene Expression

The regenerative capacity of LR-PRP extends to genomic regulation. Devereaux, et al., (1) evaluated 84 extracellular matrix and adhesion molecule genes, demonstrating significant modulation following LR-PRP exposure. These changes included regulation of matrix metalloproteinases, integrins, and adhesion molecules, reflecting active ECM remodelling. Earlier work by Devereaux, et al., (15) confirmed that LR-PRP enhances fibroblast proliferation, collagen synthesis, and tissue tensile strength. These findings indicate that LR-PRP acts through coordinated cellular and molecular pathways rather than isolated growth factor release.

Biogenesis: A Systems-Level Framework

The term “biostimulation” has traditionally been used to describe PRP effects; however, it inadequately reflects the complexity of the biological processes involved. High-dose, mononuclear cell-rich LR-PRP initiates a broader regenerative process that may be more accurately described as biogenesis. Biogenesis encompasses collagen fibrillogenesis, angiogenesis, immune modulation, and restoration of tissue architecture. It involves multiple anatomical layers, including the dermis, adipose compartments, fascial planes, and ligamentous structures, representing a systems-level regenerative response. This framework distinguishes between transient effects, such as hydration or oedema, and sustained structural remodelling.

Clinical Implications

The relationship between platelet dose and clinical effect has direct implications for aesthetic practice. Preparations delivering less than 1-2 billion platelets per 5 mL are unlikely to achieve sufficient signalling to induce sustained regeneration. In contrast, higher doses provide greater ligand density and enhanced paracrine signalling, supporting tissue remodelling over time.

Clinical translation within aesthetic medicine has been demonstrated in facial rejuvenation studies using higher-quality LR-PRP systems. Everts, et al., (16) evaluated the use of LR-PRP in facial rejuvenation and reported measurable improvements in wrinkle reduction, skin firmness, and dermal density following a series of three treatments administering injections subcutaneously and intradermally. Objective biometric assessments demonstrated a reduction in subepidermal low echogenic band (SLEB) thickness alongside increased dermal density, suggesting structural changes rather than transient surface effects. Importantly, this study utilised a double-spin system designed to capture a broader cellular fraction, including platelets and leucocytes, distinguishing it from plasma-only tube preparations. The observed improvements in skin quality were consistent with enhanced fibroblast activation and extracellular matrix remodelling, mechanisms that have been demonstrated in vitro in (1).

While the study was limited by sample size and should be interpreted with appropriate clinical caution, it provides relevant translational evidence that LR-PRP preparations with higher biological integrity are associated with measurable aesthetic outcomes. These findings align with the broader principle that LR-PRP efficacy is contingent upon

both platelet dose and cellular composition, rather than the mere presence of platelets. Regenerative changes typically occur and peak over 8 - 16 weeks, reflecting ECM remodelling and angiogenesis rather than immediate volumetric effects. Early post-treatment changes should therefore be interpreted with caution.

PRP Type	Approximate Platelet Dose	Expected Biological Effect
Tube PRP, low dose	<1-2 billion platelets/5 mL	Limited, transient response
Moderate PRP	3-5 billion platelets/5-7 mL	Variable regenerative response
High-dose PRP	≥10 billion platelets/5-7 mL	Sustained tissue regeneration

Table 1: Platelet dosage

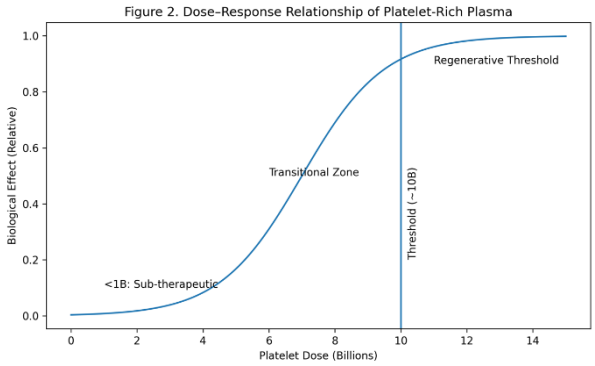

Figure 2. Dose-Response Relationship of Platelet-Rich Plasma. A conceptual dose-response curve illustrates the relationship between platelet dose and biological effect. At lower doses (<1 billion per 5 mL), biological activity remains below the threshold required for sustained regeneration. As platelet dose increases towards ≥10 billion platelets per 7 mL and beyond, a threshold is reached at which cellular signalling becomes sufficient to induce coordinated tissue remodelling. Beyond this point, incremental increases in dose may enhance the magnitude and duration of response, within physiological limits (adapted from (6, 7)).

Discussion

The heterogeneity of PRP preparations represents a significant challenge in both clinical practice and research. The assumption that all PRP is equivalent is not supported by current evidence. Platelet dose and cellular composition are fundamental determinants of efficacy. Low-dose tube systems may fail to achieve biologically meaningful outcomes, whereas high-dose, leucocyte-rich preparations initiate coordinated regenerative processes.

The inclusion of clinical aesthetic data, such as the findings reported by Everts, Pinto (16), supports the translational relevance of high-quality PRP preparations. When considered alongside dose-dependent orthobiologic studies and mechanistic in vitro data, a consistent pattern emerges in which biological integrity of the LR-PRP preparation directly influences clinical outcome. The concept of biogenesis provides a useful framework for understanding these effects and aligns with emerging evidence from both experimental and clinical studies.

Conclusion

PRP should be considered a spectrum of biologically distinct preparations rather than a uniform therapy. The distinction between low-dose and high-dose LR-PRP is critical for clinical efficacy. High-dose Lr-PRP, delivering ≥10 billion platelets per 7 mL or less, supports a process of biogenesis characterised by sustained tissue regeneration and structural remodelling. Standardisation through frameworks such as DEPA, alongside transparent reporting of platelet dose, is essential for advancing aesthetic medicine and aligning clinical practice with biological evidence.

Conflict of Interest: *Jeannie Devereaux is the scientific officer for High Tech Medical Pty Ltd, the distributors of Emcyte Pure PRP.*

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Menopause as a Multisystem Transition: Implications for Cosmetic Medicine

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Abstract

Perimenopause and menopause represent a complex, multisystem transition. Fluctuations and eventual deficiency of oestrogen and progesterone, and relative androgen predominance, contribute to alterations in skin structure, hair cycling, fat distribution, brain function, and musculoskeletal integrity. For cosmetic physicians, this has direct implications for treatment planning and outcomes as interventions may yield variable outcomes due to the underlying biological changes. This article outlines the physiology of menopause and its aesthetic manifestations, emphasising the need for an integrated, medically informed approach. Holistic care that addresses hormonal, metabolic, and psychological factors is essential for optimising outcomes in this growing patient demographic.

Hormonal Physiology

Menopause is defined retrospectively as 12 months of amenorrhoea, reflecting cessation of ovarian function, while perimenopause describes the transitional period of hormonal fluctuation preceding this endpoint (1). Relative androgen predominance may occur throughout this period due to a slower decline in circulating androgens. In Australian women, menopause occurs at a mean age of 51 years, with perimenopausal symptoms often beginning in the mid-to-late 40s and persisting for 2-10 years (1).

Oestrogen receptors are widely distributed throughout the body, including the skin, hair follicles, adipose tissue, skeletal muscle, bone, brain, and urogenital tissues. Consequently, fluctuating oestrogen levels during perimenopause produce multisystem effects, contributing to deterioration in skin quality, altered hair cycling, fat redistribution, sarcopenia, vasomotor instability, mood and cognitive change, and genitourinary atrophy (1).

Skin Changes

Oestrogen receptors, predominantly ER-β, are widely distributed throughout the skin but are most concentrated in the face, vagina and lower limbs. Here, they play a vital role in cutaneous function and maintenance (2).

Approximately 30% of cutaneous collagen is lost within the first five years of menopause, followed by an ongoing decline of around 2% annually over the subsequent 15 years. Parallel reductions in elastin also contribute to the progressive dermal thinning, skin laxity and wrinkle formation in postmenopausal women (3). It is important to note that these changes are related to postmenopausal age, not chronological age.

Oestrogen deficiency impairs epidermal barrier function through reduction in keratinocyte proliferation, sebaceous gland activity and epidermal lipid production. A concurrent decrease in glycosaminoglycans impairs water retention and increases transepidermal water loss. Altered stratum corneum integrity and reduced antioxidant capacity further promote skin sensitivity, low-grade inflammation and increased susceptibility to environmental irritants and ultraviolet-mediated damage (2). In practice, these changes are clinically significant as they contribute to dullness, textural change, impaired wound healing and increased reactivity following irritative treatments.

Emerging evidence suggests that systemic menopausal hormone therapy (MHT), delivered either via oral or transdermal routes, may confer measurable benefits in skin ageing and overall skin quality. A 2023 systematic review and meta-analysis by Lilit Pivazyan et al. evaluated the cutaneous effects of MHT and found improvements in skin hydration, elasticity, thickness, and collagen content in women receiving therapy compared with controls (4). The greatest benefits appeared to occur when therapy was initiated earlier in the menopausal transition. Importantly, although MHT may improve baseline skin quality and potentially enhance responsiveness to cosmetic interventions, it should not be prescribed solely for aesthetic benefit and must be considered within the broader context of menopausal symptom management and individual risk assessment.

There is a more recent trend to apply topical oestrogen products to target treatment sites. A contemporary systematic review suggests that topical oestrogen therapy may improve menopausal skin ageing through enhancement of

skin thickness, elasticity, hydration, collagen content, and extracellular matrix integrity in women with oestrogen-deficient skin (5). However, the overall quality of evidence remains limited by small sample sizes, heterogeneous formulations, and short follow-up duration (5). Concerns also remain regarding systemic absorption and long-term safety, particularly with prolonged facial application. Consequently, these therapies should be approached as hormonally active treatments rather than conventional cosmeceuticals.

Methyl estradiolpropanoate (MEP) technology represents an emerging approach to menopause-related skin ageing. MEP is a synthetic oestrogen designed to activate cutaneous oestrogen pathways while undergoing rapid metabolism into inactive compounds, limiting systemic hormonal exposure. Several small clinical studies involving postmenopausal women have demonstrated improvements in hydration, texture, laxity, and overall skin quality following topical MEP application over 12–20 weeks (6-8). However, the current evidence base remains limited by small sample sizes, short study duration, and substantial industry involvement. While MEP technology is biologically plausible and appears well tolerated, further independent studies are required to clarify its long-term efficacy, safety, and comparative effectiveness relative to conventional hormonal and procedural therapies.

Hair Changes

Declining oestrogen levels, combined with relative androgen predominance during the menopausal transition, contribute to the development of female pattern hair loss (FPHL) (9,10). These hormonal shifts alter hair follicle cycling through shortening of the anagen (growth) phase and prolongation of the telogen (resting) phase, resulting in progressive follicular miniaturisation and reduced hair density. Clinically, this typically presents as diffuse thinning over the crown and central scalp with preservation of the frontal hairline. Hair loss during menopause is frequently multifactorial, with hormonal change often compounded by iron deficiency, thyroid dysfunction, nutritional deficiency, psychological stress, and age-related genetic predisposition (10). Assessment should therefore include evaluation for reversible contributors, particularly in women presenting with rapid shedding or diffuse thinning.

Management requires a multimodal approach incorporating medical, hormonal, and regenerative strategies. Topical minoxidil remains first-line therapy for female pattern hair loss, with low-dose oral minoxidil and anti-androgen therapies considered in appropriately selected patients (9). Evidence supporting MHT specifically for hair preservation remains limited. While oestrogen may indirectly support follicular health and reduce shedding in some women, androgen-mediated mechanisms frequently predominate, and MHT should not be considered primary treatment for FPHL (10).

Regenerative therapies are increasingly utilised within cosmetic medicine to support follicular function and improve hair density. Platelet-rich plasma (PRP) is currently the most widely studied procedural treatment and appears to improve hair density, shaft diameter, and shedding severity in both male and female pattern hair loss (11). Although treatment protocols remain heterogeneous, PRP is generally considered safe and may be particularly useful as an adjunctive therapy in early-stage disease.

Growth factor and exosome-based therapies have also gained increasing attention within regenerative aesthetic medicine. Exosomes are extracellular vesicles involved in intercellular signalling and tissue repair. Preliminary studies suggest exosome therapies may stimulate dermal papilla activity, enhance perifollicular vascularity, and prolong the anagen phase (12). At this time, clinical evidence remains limited by small patient numbers, lack of protocol standardisation, and short follow-up periods, but is generally considered a safe adjunctive treatment option (12).

Low-level light therapy (LLLT) has demonstrated benefit in female pattern hair loss through photobiomodulation mechanisms that appear to enhance mitochondrial activity, increase perifollicular blood flow, reduce inflammation, and prolong the anagen phase (13). Recent systematic reviews have reported positive effects on hair density and thickness with minimal adverse effects, supporting its role as a non-invasive adjunctive treatment option (13). Combination therapy using LLLT alongside PRP, topical agents, or oral therapies may provide synergistic benefit.

Bone and Soft Tissue Changes

The menopausal transition triggers significant metabolic shifts and associated fat redistribution. Within the face, selective atrophy and descent of superficial and deep fat compartments occur concurrently with collagen depletion, skin laxity, and progressive skeletal remodelling (14,15). Accelerated sarcopenia and bone resorption occurs due to reduced oestrogen-mediated effects on muscle protein synthesis and bone turnover regulation. Loss of muscular support and bone structure manifests clinically as temporal hollowing, midface deflation, deepening of the nasolabial folds, increased jowl formation, submental fullness, and overall facial descent (15).

These changes have important implications for cosmetic treatment planning. Menopausal facial ageing should not be approached as isolated volume loss, and indiscriminate filler replacement may exacerbate lower-face heaviness or produce unnatural facial proportions in patients with reduced tissue support. Treatment strategies should instead prioritise restoration of structural support, collagen stimulation, skin quality, and facial balance (14). Biostimulatory injectables, regenerative therapies, and energy-based skin tightening procedures may therefore play a particularly important role in this population.

Psychosocial and Identity Changes

Psychological symptoms and cognitive challenges are often the earliest signs of perimenopause and can affect up to 80% of women (16). Women commonly report anxiety, low mood, irritability, impaired concentration, memory disturbance, and brain fog, often occurring during a life stage already associated with substantial occupational, caregiving, and identity-related pressures. The simultaneous cosmetic changes compound this sense of physical and mental transformation with many women reporting a sense of ageing "overnight". For many patients, cosmetic consultation during midlife extends beyond simple appearance-based concerns and reflects a broader desire to regain familiarity, confidence, and control during a period of significant biological transition.

Cosmetic physicians are in an ideal position to recognise the hormonal drivers of mood disturbance and cognitive change, particularly as patients themselves rarely make this connection (16). Recognition of this association and appropriate referral to a menopause-informed general practitioner or specialist can be transformative. MHT has been shown to significantly improve mood, anxiety, sleep disturbance, and cognitive symptoms in appropriately selected women.

Integrated Treatment Approach

Management of menopausal patients requires a shift from isolated aesthetic interventions to a more integrated model of care. While cosmetic treatments remain central, their effectiveness is enhanced when combined with strategies addressing underlying physiological drivers. Effective consultation in this group involves validating concerns, setting realistic expectations, and fostering a therapeutic alliance that extends beyond procedural outcomes. Our practice offers a GP led women's health clinic, working in tandem alongside our cosmetic physicians. Similar telehealth services are also increasingly available.

Conclusion

Menopause represents a profound multisystem transition with clear implications for cosmetic medicine. The visible changes in skin, hair, fat distribution, and musculoskeletal support are direct reflections of underlying hormonal and metabolic shifts.

Effective management requires recognition that cosmetic outcomes are inseparable from internal physiology. A holistic, integrative approach—incorporating medical, aesthetic, and psychosocial considerations—is essential for optimising patient outcomes.

As the population ages and demand for aesthetic treatments continues to grow, the role of the cosmetic physician will increasingly involve bridging the gap between systemic health and external appearance, delivering care that is both scientifically grounded and individually tailored.

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Mirror, Mirror on the Wall: Personality Constructs and the Identification of Body Dysmorphic Disorder

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Body dysmorphic disorder (BDD) is a relatively common but under-recognized psychological condition consisting of preoccupation with appearance and distress at imagined or minimal defects or flaws. The focus of the appearance concerns are the nose, hair, or skin, but it is also possible for more than one body part to be included. (1) Associated features are marked impairment in psychosocial functioning, poor quality of life, and high suicidality rates.

The development of BDD is assumed to be multifactorial, incorporating previous negative early life experiences such as teasing and genetics. (2) Several studies have shown that BDD commonly co-occurs with obsessive-compulsive disorder (OCD), eating disorders (ED) and autism spectrum disorders (ASD) and shares obsessive-compulsive (OC) symptoms, suggesting a common etiological basis. (3) Overlapping features are obsessional thinking and repetitive behaviours. (4) However, whilst it has been suggested that BDD be considered an obsessive-compulsive spectrum disorder, BDD does not exist outside of personality constructs. These personality constructs provide both motivations to seek out cosmetic procedures but also relate to dissatisfaction with results and desire to make their displeasure known more widely, leading to reputational damage and potential complaints to authorities.

Much attention has been paid to cognitive behavioral models of BDD, describing certain personality traits as risk factors that predispose an individual to BDD such as perfectionism and aesthetic sensitivity. (5,6,7) However there appears less recognition of borderline personality traits in those suffering BDD. Individuals with borderline personality traits or borderline personality disorder (BPD) are likely highly represented in the population seeking cosmesis. They are acutely aware of social judgment and their pervasive sense of 'not being good enough' drive attempts for cosmetic self-improvement. Being highly susceptible to emotional responses, they are drawn in by media demonstrating models of perfection. Specifically, they suffer from an unstable self-identity along with a poor sense of self. They tend to adopt interpersonal relations and low tolerance for frustration. Their sense of entitlement, externalization of problems, cognitive distortions (e.g. black and white; all or nothing thinking) lead to beliefs that all problems will be resolved with a particular cosmetic procedure. Some difficulties include:

- Pre-procedural unrealistic expectations
- Idolization and then demonization of cosmetic physician
- Poor truth telling regarding medical history, previous procedures, compliance with post procedural instructions
- Post-procedural rumination on undesired effect
- Paranoia that procedure/product was not 'value for money' or exploitative
- Competitive focus and comparison of outcome with others
- Need for special status results in their becoming demanding patients
- Interpersonal relating can see boundary crossing placing physician at risk
- Emotional dysregulation and anger may result in complaints made to authorities or retaliation on social media (public 'naming and shaming')

Identification can be determined by thorough history taking including demographic information regarding the degree of appearance-related preoccupation, distress and lifestyle impairment. Earlier age of onset suggests greater likelihood of the presence of a disorder, its severity and potential comorbidity. (8)

Various specific screeners exist for both BDD and for BPD but differ on psychometric properties of reliability and validity. Self-report measures are hampered by the rater's lack of insight and/or the presence of delusionality, which underpin these psychopathologies. Gaining informed consent is imperative, however can be difficult to achieve in conditions where there is marked personality instability and for which self-injurious behaviour occurs.

Pre-treatment recommendations should include a more extensive pre-procedure consultation but also an awareness that consideration of

psychological factors should continue throughout the journey. There should be a greater involvement of the client in decision making and the opportunity to 'sleep on it', minimizing the risk of any impulsivity negatively impacting the post procedure result. A staggered approach to treatments also allows for the acceptance of subtle changes over time. As with all procedures the risks need to be weighed with the potential benefits.

Treating clients with BDD or BPD carries with it a risk to the cosmetic physician. For some, these diagnoses represent dangerous clients who 'cannot be pleased'. Validation of a patient's concerns, in-depth explanations of treatments, adverse events and expected recovery, as well as providing full disclosures regarding any associated costs, will more likely lead to patient satisfaction. There should always be a pathway for referral of patients for whom screening highlights risk. Always consider requesting a psychologist's involvement if you are concerned.

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The Evolution of Cosmetic Nursing into a Much More Complex Role Over the Twenty First Century

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The first cosmetic nurses in Australia included those who were trained overseas and arrived to find the need to create their own job opportunities, and those invited to learn how to assist cosmetic medical practitioners. Trade companies such as Collagen Aesthetics (acquired by Allergan) in the nineties often used nurses to instruct doctors on the use of new products and it quickly became clear that nurses could be very effective working with Cosmetic Physicians, Cosmetic Surgeons Plastic Surgeons and Dermatologists.

The Australasian Academy of Cosmetic Dermal Science started training nurses in dermal therapies in 2004 and cosmetic injectables in 2007 with accredited courses. Since then, many other providers began offering courses in cosmetic nursing.

By 2011 there were nurse practitioners specialising in cosmetic nursing and in 2013 Cosmetic Nursing was officially described as a specialty with the publication of a nursing model of practice by O'Keefe and Hoitink3. O'Keefe went on to publish standards for cosmetic nursing in 20152 following the first comprehensive "Professional Practice Standards and Scope of Practice for Aesthetic Nursing Practice" created by a working party of the Australiasian College of Cosmetic Surgery (Now ACCSM) (1). The Nursing and Midwifery Board made its first position statement on cosmetic nursing in 2015, with an update in 2025.

Over this time the skills employed by cosmetic nurses have gone from simple dermal therapies, neurotoxin injections for wrinkles and traditional use of resorbable dermal fillers to a raft of additional, often novel treatments, and far more extensive use of cosmetic injectables, including deeply placed filler using cannula as well as sharp needle.

The explosion of possibilities in cosmetic nursing has raised concerns for the need for standards in this field, which will most likely take some work maintaining given the rapid growth of the industry.

Cosmetic nurses now more often work in nurse led practices with remote medical support and need to perform all the duties of a well-rounded practitioner, including assessment of physical and mental health, good communication, the ability to address the needs of the patient even if this is through referral or alternative means, and the skills to perform all aspects of skin and facial assessment, rejuvenation, enhancement and correction, as well as body treatments in some cases. This role is a far cry from the ancillary services offered in the rooms of medical specialists and requires far more self-governance.

The Cosmetic Physicians College of Australasia has stated their preferred standards for nurses performing cosmetic procedures alongside Cosmetic Physicians as follows:

A competent Cosmetic Nurse should have a minimum knowledge and skills level for injectable procedures, and adequate knowledge regarding energy-based devices and chemical and physical skin resurfacing. The Cosmetic Nurse should also have good knowledge of products and devices used in the field as well as the history of their use, and they should be involved in continuing education in Cosmetic Nursing in order to remain current.

The Cosmetic Nurse must have good communication, consultation and assessment skills in order to detect concurrent physical, emotional and psychological concerns in the patient, as well as correctly identify the cosmetic concerns, addressing important issues, referring appropriately and determining the course of treatment that will assist the patient in the best way. Some practical skills may be delegated to other team members where nurses micro specialise.

To further itemise the skills of the Cosmetic Nurse, these should be as follows:

- Understanding of multi-disciplinary practice and scope of practice for each cosmetic professional
- Knowledge of the governance surrounding cosmetic medical practice
- Understanding appropriate marketing strategies,

- Awareness of the intricacies of medical and nursing and practice indemnity
- Correct understanding and application of Nurse Practitioners as prescribers and the Registered cosmetic nurse's role in a supervisory capacity over Enrolled nurses.
- Effective communication and consultation strategies in aesthetic practice.
- Good assessment strategies as part of a holistic consultation
- Appropriate knowledge of when and to whom to refer,
- Ability to obtain fully informed consent as per all regulatory guidelines,
- Ability to create good written and photo documentation and other information to support positive patient outcomes.
- Knowledge of patient management systems currently used in aesthetics, and how best to use them to deliver excellent care
- Knowledge of assessment techniques including anthropomorphic measurements including facial angles and lines and proportions
- Ability to administer neurotoxin to all areas of the face and neck within their scope, taking the anatomy and physiology into account, and the various cosmetic and therapeutic uses
- Ability to administer dermal fillers and biostimulants within their scope to all areas of the face and neck taking anatomy and physiology into account
- Understanding of the rheology and pharmacology of cosmetic injectables, including the indications for placement, longevity and risk of migration in relation to rheology and placement
- Ability to select appropriate products from the ranges for each concern
- Ability to select the correct injection site, depth, needle or cannula angle, plane, dose and injection speed to optimise safety, including keeping boluses small and including micromovements of the tip of the needle
- Knowledge of absolute and relative contraindications for cosmetic injectables.
- Identification of danger zones containing important structures
- Delivery of appropriate aftercare for all treatments
- Knowledge of how to manage all complications arising from cosmetic injectables they perform.
- Knowledge of the theory and application of dermal therapies in cosmetic medicine
- Knowledge of how to deal with or refer all the various skin disorders presenting to cosmetic clinics
- Understanding of skin physiology and anatomy including skin appendages and all layers such as epidermis, dermis, SMAS, muscles, superficial fat, fat pads, fascia, tendons, periosteum and bone
- Understanding of the wound healing response including healing of incisions, excisions and collagen induction treatments
- Knowledge of the effects of intrinsic and extrinsic ageing on all tissues
- Knowledge of and ability to appropriately recommend cosmetic products and cosmeceuticals
- Understanding of chemical and physical skin resurfacing
- Understanding of energy-based devices basic principles and application
- A deep understanding of facial anatomy for each area of the face where they may inject. These include the muscles and their origins, insertions, functions and relationships to each other, vessels, their origins, anastomoses and perivascular tracks, nerves and their courses and supply areas, fat pads at the various levels and their extents and communications, SMAS and aponeuroses, and other structures in the face and neck.

Cosmetic Nursing bodies are also continuing to address the issue of standards in the specialty, and it is hoped that the Medical and Nursing professions might together define useful guidelines for this field that has grown so significantly this century.

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Hymenoptera Sting Allergy as a Predictor for Hyaluronidase Allergy – is it a Thing?

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Introduction

It is a widely accepted, certainly amongst Australian cosmetic doctors, that a prior history of allergy to bee sting should lead to a level of caution when administering hyaluronidase. This is because hyaluronidase is present in Hymenoptera (bee and wasp) stings.

Discussion

Hyaluronidase allergy can lead to three types of reaction. Acute allergy (type 1 reaction) with localised swelling, best treated with anti-histamines. Delayed (type IV) reaction is best treated with systemic corticosteroid, and thirdly acute anaphylactic reaction.

The question of cross reaction between bee sting allergy and hyaluronidase becomes pertinent when faced with a patient with just such a history, but who is in need of hyaluronidase to remove hyaluronic filler. One does not wish to complicate an already negative outcome requiring dissolution of filler with further allergic reaction or the risk of anaphylactic shock.

A literature search and review was undertaken to ascertain the importance of Hymenoptera allergy when considering hyaluronidase therapy. It should be noted that different forms of hyaluronidase are available in different countries. Some of these may be of different origin and have different properties. In Australia, only Hyalase© is available (Sanofi-Aventis Australia Pty Ltd).

Cross sensitivity between hymenoptera and hyaluronidase is mentioned in the literature. Murray et al in their "Guideline for the Safe Use of Hyaluronidase in Aesthetic Medicine, Including Modified High-dose Protocol' (1) state "Allergies to bee and wasp venom…. pose a significant risk of cross reactivity" although they provide no references or evidence for this conclusion. Lyall et al (5) report two cases of retrobulbar hyaluronidase in patients with a history of allergy to insect or wasp stings, one who developed delayed onset localised reaction (despite having received hyaluronidase on several occasions previously without incident) and one who developed an acute systemic reaction. This was published in 2012 and no mention of the type of hyaluronidase used is made.

In contrast the consumer medicine Information summary for Hyalase (2) makes no mention of hymenoptera sting allergy as a caution or contra-indication. Other investigators (4) have also been unable to find any definitive increased risk for hyaluronidase use in patients with a history of Hymenoptera sting allergy and note that bee stings contain an array of other allergens. It follows that a reaction to bee sting does not mean that the patient is allergic to hyaluronidase – which is just one constituent of the sting. It is worth noting that Hyaluronidase used medically does not originate from hymenoptera, but is generally either of mammalian origin, or human recombinant (Hylenex, Halozyme Therapeutics, San Diego, California). Cavallilini et al (3) do not believe that a history of bee venom allergy is pertinent, stating "The allergy history of the patient is unrelated to the reactions of hyaluronidase".

It should also be noted that allergy to hyaluronidase, in the doses used subcutaneously in cosmetic medicine, are generally accepted to be extremely rare. The incidence of localised allergies is in the range of 0.05% to 0.69%, (3) with the majority of these being minor swelling with or without itch. Urticarial and angioedema occur in less than 0.1% and generalized allergic reactions occur more commonly with high doses and intra-venous use and are extremely rare with low dose sub-cutaneous use.

Conclusion

Hymenoptera stings contain a vast array of potential allergens, therefore a history of allergy to bee sting does not indicate an allergy to hyaluronidase per se. It follows that general testing for allergy to bee or wasp sting is a useless endeavour as it is not testing specifically for hyaluronidase allergy.

Hyaluronidase preparations in use today are of mammalian or human recombinant origin, not hymenoptera origin, and the risk of cross reaction between species is extremely low or non-existent. The consumer information for Hyalase © does not

caution against use in those with a history of insect bite allergy. Reports of reactions to hyaluronidase in individuals with bee or wasp sting allergy are extremely scarce, despite its widespread use in various medical fields.

In my opinion there is no rationale for prohibiting the use of hyaluronidase in cosmetic patients with a history of bee or wasp sting allergy.

If allergy to hyaluronidase is suspected a skin prick test can be performed in clinic (provided appropriate resuscitation drugs and equipment are available). From speaking with Dr Paul Campbell, Head of Immunopathology at QML Pathology, I understand that this can be achieve via a small dose (3-5 units), injected subcutaneously. A positive result is an erythematous patch larger than 3mm at 15 minutes.

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Exercise and Weight Loss Misunderstood

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Humans desire to change and improve their physique and shape to achieve perceived perfection. We observe the effects of aging on our soft tissues and our bones, and we intervene with injectables, electronic devices and exercise regimes. Weight gain has become a significant dilemma and the "weight loss procedures" have become multi-billion-dollar industries. These practices range from medications for weight loss, diets, fat-removal procedures, gastric surgery, and exercise programs. Current scientific data examines our metabolic functions and the significance to energy expenditure.

It is, and has been, commonly accepted that exercise 'burns calories' and is a way to lose weight. Therefore, the common argument is that the more we exercise, the bigger our chance for losing weight.

Robust scientific studies are published regarding metabolism and energy expenditure (2). Anthropologist, Herman Pontzer, has spent time living with, and studying, the Hadza, a hunter-gatherer African tribe (1). The Hadza men and women spend around ten times more physical activity per day that the average American – they get more physical activity in a day than the typical Westerner gets in a week. However, measurements of their daily energy expenditure indicates that they burn the same number of calories as other populations, including the sedentary Westerners (3). These studies were repeated with other hunter-gatherer populations, by Anthropologist Sam Urlacher with the Shuar in the remote Amazon (4), Anthropologist Mike Gurven with the Tsimane in Bolivia (5), and Epidemiologist Lara Dugas who analysed energy expenditures reported for ninety-eight populations around the globe (6), and the results were confirmed.

These data show that the energy expenditures of individuals are maintained within a narrow range, regardless of exercise or lifestyle physical activities. The Basic Metabolic Rate (BMR) is a measure of the total work performed by all the cells of the body at rest. The most energy hungry organs are the brain, liver and gut. Although muscle equals around 42% of body weight, it only demands 16% of the BMR. Energy resources are limited, and when physical activity and the energy demand from muscles increase, the body maintains the energy balance by reducing the energy spent on other metabolic tasks, thereby maintaining the narrow window of energy expenditure.

Therefore, exercise alone plays a minimal role in the control of obesity. The amount, and types of food we eat have a greater effect on our weight gain or weight loss. This is further demonstrated by the GLP-1 agonists that have become widely used for weight loss. These drugs mimic the natural hormone glucagon-like-peptide-1 produced in the gut after eating. They act on the hypothalamus and suppresses appetite by reducing hunger, increasing feelings of satiety, and curbing food cravings, resulting in dramatic weight loss (10).

Regarding exercise, our health depends on daily physical activity, and without exercise we get sick. Although exercise is not a main function of weight management, there is overwhelming evidence of the benefits of exercise that include normal immune responses, and improved mood, stress levels, and depression (9). Cognitive functions are increased by exercise, due to release of neurotrophins that promote growth of brain cells (8), and exercise triggers the release of nitric oxide that maintains arterial elasticity and normal blood pressure (7).

Considering these findings, our health industries and medical practitioners should consider advice for weight loss to focus mainly on nutritional habits, rather than exercise. Weight management is mainly a function of eating, where exercise is necessary for general health.

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Microbotox: A Paradigm Shift in Facial Rejuvenation

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Abstract

Microbotox, an innovative technique involving intradermal injections of highly diluted botulinum toxin type A, has emerged as a transformative approach in facial rejuvenation by precisely targeting superficial muscles and skin structures. Traditional botulinum toxin treatments, while effective at reducing dynamic facial wrinkles, often result in an undesirable "frozen" appearance due to deep muscle paralysis, thereby limiting natural facial expressions. In contrast, Microbotox enhances skin texture, reduces pore size, and refines facial contours while preserving the patient's natural expressiveness, effectively avoiding the mask-like effect associated with conventional methods. By modulating superficial muscle activity without inducing complete paralysis, this technique offers a more nuanced and patient-friendly approach to aesthetic enhancement. This review delves into the evolution, underlying mechanisms, clinical applications, controversies, and future prospects of Microbotox, highlighting its significant role in advancing aesthetic medicine and setting new standards for minimally invasive cosmetic procedures.

Introduction

Since its introduction into cosmetic practice, botulinum toxin type A has become a cornerstone in facial aesthetic treatments. Its ability to temporarily paralyse muscles by inhibiting acetylcholine release at the neuromuscular junction effectively reduces dynamic wrinkles. However, traditional botulinum toxin injections often result in an overly immobilized facial expression, commonly referred to as the "frozen face." This limitation has driven the search for innovative techniques that achieve facial rejuvenation while maintaining natural muscle movement.

The advent of Microbotox, pioneered by clinicians seeking more nuanced results, represents a significant advancement in this field. Microbotox involves the intradermal injection of highly diluted botulinum toxin into multiple microdroplet sites across the treatment area. This approach targets superficial muscle fibres and skin appendages, leading to improved skin texture, reduced pore size, and subtle modulation of muscle activity without complete paralysis.

Mechanisms Underlying Skin Rejuvenation

Botulinum toxin exerts its effects by inhibiting the release of acetylcholine from presynaptic nerve terminals at the neuromuscular junction, leading to temporary muscle relaxation. In traditional applications, injections are administered into deep muscles to paralyse them fully, reducing dynamic wrinkles formed by muscle contractions.

In Microbotox techniques, the toxin is diluted and injected intradermally or at the interface between the dermis and superficial muscle layers. This targets the small superficial muscles that contribute to fine lines and skin texture irregularities, as well as modulating the activity of sebaceous and sweat glands. The result is a reduction in fine wrinkles, improved skin texture, decreased oiliness, and tightened pores, all while preserving natural facial expressions.

Understanding the biological mechanisms behind skin rejuvenation techniques is crucial for advancing therapeutic approaches. Brenner and colleagues investigated the effects of mesotherapy reagents—bioactive substances injected into the skin—on human skin fibroblasts in vitro to elucidate how these treatments promote skin rejuvenation at the cellular level. (1)

Human dermal fibroblasts were treated with various mesotherapy solutions containing combinations of vitamins, minerals, amino acids, and hyaluronic acid. Assessments of cell proliferation, collagen production, and gene expression profiles were conducted. The treatments resulted in increased fibroblast proliferation and enhanced collagen synthesis, which are key factors in improving skin elasticity and reducing signs of aging. Gene expression analysis revealed upregulation of genes involved in extracellular matrix formation and cell proliferation. These findings provide a scientific basis for the clinical effects observed in mesotherapy, suggesting that the bioactive reagents stimulate fibroblast activity and promote

collagen production, thereby contributing to skin rejuvenation.

Development of Microbotox Techniques

The concept of Microbotox emerged from the need to refine botulinum toxin applications to achieve more natural-looking results. In the early 2000s, a technique was introduced that involves injecting multiple microdroplets of diluted botulinum toxin into the dermis. This method aims to improve skin texture and sheen, decrease sweat and sebaceous gland activity, and target superficial muscles responsible for visible rhytids'.

This approach involves diluting botulinum toxin type A in saline, with or without the addition of lidocaine, to create a solution containing approximately 20 units per millilitre. Using a fine 32-gauge needle, tiny, blanched wheals are injected intradermally at closely spaced intervals. For treatments of the lower face and neck, hundreds of such microdroplets are administered to enhance skin texture, smooth horizontal creases, reduce vertical neck banding, and improve the contouring of the cervicomental angle by promoting better adherence of the platysma muscle.

Building upon the foundational work of Dr. Woffles Wu, I modified the Microbotox technique to enhance its practicality and effectiveness in my clinical practice.(2) In my approach, I draw the Microbotox solution from a standard 100-unit vial of botulinum toxin type A reconstituted with 5 milliliters of normal saline, resulting in a final concentration of 20 units per millilitre. Each 1-millilitre syringe is used to deliver approximately 100 intradermal microinjections (see Figure 1), corresponding to approximately 0.2 units per injection site. For treatments targeting the lower face and neck, typically 1 millilitre of solution is required per side. The injections are administered intradermally using a fine 32-gauge needle, producing small, transient wheals at each injection point. This technique is designed to modulate superficial muscle fibres and reduce sebaceous and sweat gland activity, thereby improving skin texture, reducing pore size, and refining facial contours while preserving natural facial expression. This concentration is consistent with commonly reported Microbotox protocols in the literature, which typically range between 20 and 28 units per millilitre depending on treatment indication.

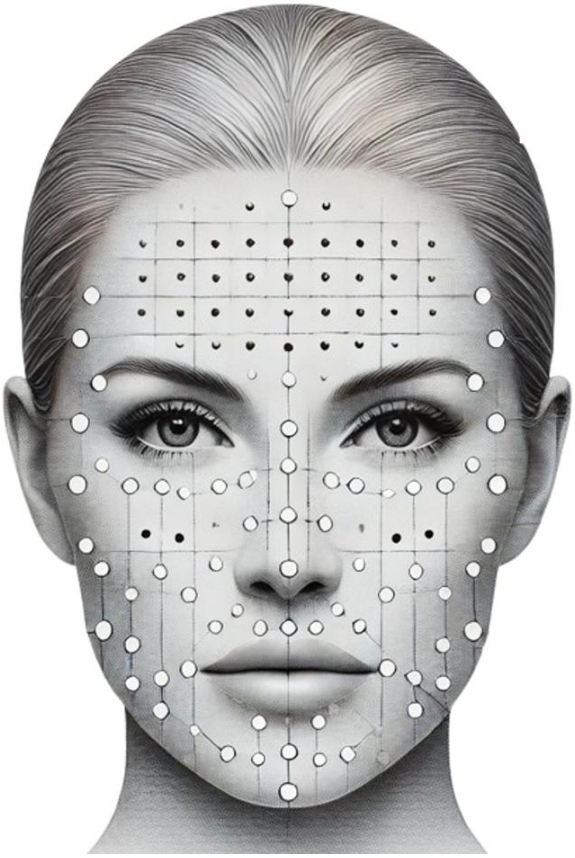

Figure 1: Distribution pattern of intradermal Microbotox injection sites. Solid black dots represent standard microdroplet injection points, while white circles indicate areas where a slightly larger microdroplet volume may be delivered based on anatomical considerations. In this protocol, botulinum toxin is diluted to 20 units per millilitre, and approximately 100 intradermal injections are administered per millilitre, corresponding to an average dose of approximately 0.2 units per injection site.

I applied this modified method in a series of 56 documented cases focusing exclusively on the forehead to simplify the observation and assessment of results. The clinical outcomes mirrored those reported by Dr. Wu, demonstrating significant improvements in skin texture, reduction of fine wrinkles, and preservation of natural facial expressions. These findings are consistent with the clinical effects described by Wu, whose Microbotox technique utilises intradermal microdroplet injections of diluted botulinum toxin (typically within the range of 20–28 units per millilitre) delivered at closely spaced intervals to modulate superficial muscle activity and skin appendages. The reproducibility of these results in my patients supports the clinical validity of this approach. By corroborating his findings, my experience

reinforces the value of this approach in achieving subtle yet meaningful facial rejuvenation without the adverse effects commonly associated with traditional botulinum toxin treatments.

Clinical Applications

Microbotox has expanded the scope of botulinum toxin applications beyond the traditional treatment of dynamic wrinkles in the upper face. Its efficacy in treating the lower face and neck addresses areas previously considered challenging with standard techniques. Patients report high satisfaction rates due to the natural appearance and minimal side effects. The technique has also shown promise in treating enlarged pores, excessive oiliness, and mild skin laxity.

Controversies and Intellectual Property

Microbotox represents a transition from conventional deep neuromodulator injections to intradermal microdroplet techniques targeting superficial structures, a method widely associated with Dr. Woffles Wu, although subsequent publications have raised questions regarding priority and intellectual property.

By the 2010s, clinical studies confirmed the efficacy of Microbotox in refining skin texture, reducing pore size, and treating conditions such as acne and excessive oiliness. These results were achieved by targeting the superficial dermis and sweat glands, showcasing Microbotox's versatility beyond mere wrinkle reduction. During this period, it became clear that Microbotox offered significant improvements in overall skin quality, particularly in addressing conditions caused by excessive sebum production.

As the technique evolved, its popularity grew not only for treating existing signs of aging but also as a preventative measure. By the late 2010s, younger patients began adopting Microbotox to delay the onset of deeper wrinkles, favouring the subtle, natural results it produced. This preventative approach became widely accepted as patients sought to maintain a youthful appearance without resorting to more aggressive interventions.

In 2016, Dr. Kenneth Steinsapir claimed to have been the first to develop a microdroplet botulinum toxin technique for forehead lifting, holding a U.S. patent for his method. (3) Dr. Wu responded by asserting that his use of Microbotox predates Dr. Steinsapir's work, dating back to the early 2000s. (4) Wu highlighted that similar techniques had been employed in Asia long before and emphasized that he had openly shared his methods in international forums and publications.

This debate underscores the complexities of intellectual property in medical innovations. While patents can protect specific techniques, the broader concepts and incremental advancements in such methods often evolve through the collective clinical experience and shared knowledge within the medical community. This makes it challenging to attribute innovations like Microbotox to a single inventor, as they typically develop over time through a variety of contributions.

Novel Non-Invasive Delivery Systems for Botulinum Toxin Type A

The challenge of delivering large biomolecules like botulinum toxin type A through the skin barrier has prompted research into alternative delivery methods. Lee, Kennedy, and Waugh investigated the use of cell-penetrating peptide (CPP)-based self-assembling peptide systems to facilitate the topical, transdermal delivery of botulinum toxin type A. (5) Their study recognized that the size and polarity of botulinum toxin molecules hinder their penetration through the skin. By employing CPPs and self-assembling peptides, they aimed to create a non-invasive method for botulinum toxin administration.

Their findings suggest that CPP-based self-assembling peptide systems hold significant promise for delivering botulinum toxin type A without the need for injections. This approach could potentially reduce patient discomfort and eliminate risks associated with needle use. While the initial results are promising, further research is necessary to optimize these delivery systems and validate their efficacy and safety in clinical settings. The potential to replace injections with topical applications marks a significant advancement in the field of cosmetic and therapeutic dermatology.

Clinical Studies and Treatment Parameter Recommendations

Several studies have evaluated the efficacy and safety of Microbotox techniques, collectively

demonstrating significant advancements in facial rejuvenation.

Dr. Wu's clinical observations, encompassing over 1,800 documented cases, revealed substantial improvements in facial aesthetics without the undesirable side effects often associated with traditional botulinum toxin applications. (2)

A clinical crossover trial conducted by Awaida et al. involved 25 patients comparing Microbotox with the "Nefertiti lift" for lower face and neck rejuvenation.6 While both techniques proved effective, Microbotox showed superior results in improving jowls and neck volume. Patients expressed satisfaction with the outcomes, highlighting Microbotox as a safe and effective minimally invasive option for addressing soft-tissue ptosis in these challenging areas.

Swift and colleagues emphasized that precise dosing based on facial anatomy is crucial for optimal results with neuromodulators. (7) They provided detailed recommendations for injections in various facial muscles, underscoring the importance of small, accurate doses to achieve natural-looking effects while minimizing complications. This meticulous approach to dosing is essential in Microbotox applications, where the balance between efficacy and the preservation of natural expression is paramount.

In a comprehensive review by Iranmanesh et al., commonly used concentrations of botulinum toxin in Microbotox techniques ranged from 10 to 20 units per milliliter, with injection points varying widely depending on the treatment area. (8) The technique was particularly effective for fine wrinkle reduction and mid-to-lower face lifting in younger patients, as well as for neck rejuvenation in older patients with skin laxity. Clinical outcomes typically appeared within 5 to 14 days and lasted between 3 to 6 months, demonstrating both the efficacy and durability of the treatment.

A study by Ahmed and Khalil focused on 20 female patients with mild to moderate periorbital wrinkles who underwent Microbotox treatment. (9) The results showed significant improvement without affecting deeper muscle movement or facial expressions. The treatment was well-tolerated, with no significant side effects reported. This study reinforces the safety and effectiveness of Microbotox for delicate facial areas, offering a viable option for patients seeking subtle enhancements without drastic changes.

Collectively, these studies validate the clinical benefits of Microbotox, highlighting its effectiveness in facial rejuvenation with minimal adverse effects. The consistent patient satisfaction and favorable outcomes across diverse patient populations underscore Microbotox as a valuable technique in the evolving field of aesthetic medicine.

Efficacy of Microbotox Techniques

Microbotox, which involves the intradermal injection of highly diluted botulinum toxin type A, has gained attention for its ability to achieve facial rejuvenation and lifting without significant muscle paralysis. Several studies have evaluated the efficacy and safety of this technique across different facial regions.

Iranmanesh et al. conducted a clinical trial involving 30 middle-aged patients seeking facial rejuvenation and lifting. (8) Participants received intradermal injections of botulinum toxin type A diluted to 20 units per milliliter, administered across the face at 1 cm intervals using a 30-gauge needle. Assessments at baseline and four weeks post-treatment utilized the Facial Laxity Rating Scale (FLRS) and patient satisfaction questionnaires. The study reported a significant improvement in skin laxity and texture, with scores decreasing by an average of 1.2 points. The FLRS used by the authors is a clinician-based grading system where skin laxity is scored from mild to severe using numbers. Although it depends on the observer’s judgement, using the same assessor throughout helps ensure that any change in score reflects real clinical improvement rather than differences between evaluators. This system allows doctors to convert visual and tactile changes in skin texture and firmness into numerical values that can be compared over time. In practical terms, a 1-point reduction usually means moving from one severity level to the next, for example from moderate laxity to mild laxity with better contour and firmness. Therefore, an average improvement of 1.2 points represents a clear and noticeable change rather than a subtle effect, which is supported by the finding that 90% of participants reported visible improvement in facial tightness and overall appearance. Mild transient erythema was the only

side effect observed. The authors concluded that Microbotox is an effective and safe technique for facial rejuvenation and face-lifting, offering a minimally invasive alternative to surgical interventions.

Addressing the common cosmetic concern of enlarged facial pores, El Attar and Nofal assessed the efficacy of Microbotox in reducing wide facial pores. (10) In their open-label study involving 25 patients, botulinum toxin type A was diluted to 10 units per milliliter and administered intradermally at 1 cm intervals over the affected areas using a 32-gauge needle. Evaluations conducted at baseline and four weeks post-treatment included high-resolution photography and a pore grading scale. The results demonstrated a significant reduction in pore size, with an average decrease of 35% on the pore grading scale. High patient satisfaction was reported, with 88% rating their improvement as "good" or "excellent." No serious adverse events such as ptosis, facial asymmetry, dysphagia, or systemic botulinum toxin effects, were observed, suggesting that Microbotox is a promising and safe treatment modality for reducing wide facial pores. The study recommends further research with larger cohorts to confirm these findings.

In the pursuit of non-surgical alternatives for forehead rejuvenation, Wulc and colleagues introduced a technique using microdroplet injections of botulinum toxin type A to achieve a forehead lift. (11) In their retrospective study, Wulc and colleagues described a microdroplet technique for forehead rejuvenation using botulinum toxin type A, in which approximately 0.01 mL is delivered per injection, with a total dose of around 20 units distributed across the superficial forehead musculature using a fine 33-gauge needle. While this theoretically corresponds to up to 100 injection points per millilitre, the authors did not explicitly define a fixed number of injections or state that the entire volume is administered as strictly uniform 0.01 mL boluses; rather, the injections are applied flexibly according to the treatment area in a closely spaced, grid-like pattern to achieve even coverage. Therefore, the commonly cited “100 injections per millilitre” should be understood as a mathematical approximation rather than a directly prescribed procedural parameter. Analysis of pre- and post-treatment photographs, along with patient satisfaction surveys, revealed that the majority of patients exhibited a noticeable elevation of the eyebrows, averaging a 1.5 mm lift. Significant wrinkle reduction was also observed, and 92% of patients reported high satisfaction with the aesthetic outcome. Mild bruising occurred in 5% of cases but resolved without intervention. The authors concluded that the microdroplet botulinum toxin forehead lift is an effective, minimally invasive alternative to surgical procedures, providing subtle lift and wrinkle reduction with high patient satisfaction.

Further demonstrating the versatility of Microbotox, Liew described the technique and clinical effects of Microbotox injections in the lower face and neck. (12) In a clinical practice setting, patients received intradermal injections of botulinum toxin type A diluted to 10 units per milliliter, administered at 1–2 cm intervals using a 30-gauge needle. Clinical evaluation post-treatment showed improved skin texture, reduced fine lines, and a subtle lifting effect. The procedure was well-tolerated with minimal discomfort, and no significant adverse effects were reported. Liew concluded that Microbotox is an effective technique for rejuvenating the lower face and neck, providing aesthetic improvements with minimal risk of muscle weakness and high patient satisfaction.

Conclusion

Microbotox represents a significant advancement in aesthetic medicine, offering a minimally invasive and effective approach to facial rejuvenation without the adverse effects associated with traditional botulinum toxin treatments. By precisely targeting superficial muscle fibers and skin appendages, it enhances skin quality and maintains natural facial expressions, leading to high patient satisfaction. Clinical studies have consistently demonstrated its efficacy and safety across various facial regions, validating Microbotox as a valuable technique in cosmetic dermatology. As research continues to evolve, including the development of novel non-invasive delivery systems, Microbotox is poised to further expand its applications and benefits in the field of facial aesthetics.

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