Charles Runels, MD for ISCG March 2022

Improve Patient Outcomes with Difficult-to-Treat Problems by Alteration of PRP Injection Techniques…

Based on ***Functional Anatomy*** and ***Pathophysiology*** (with an Update on ***FDA Policies*** Regarding PRP)

This complete powerpoint presentation/with all references will be available for free and for use without any needed reference to the speaker at **CellularMedicineAssociation.org/iscg-free**

Premise: If the etiology of disease can be described at the level of **tissue (made of cells)**,

and if PRP improves the health of tissue by recruiting and activating pluripotent stem cells,

Then PRP might improve some diseases by improving tissue.

Since there is little if any systemic effect of PRP, it must be injected into the target tissue for it to have any chance of helping ,

So, injection technique matters—it's critical to success.

What is PRP?

Plasma with a platelet concentration greater than whole blood.
But, the concentration in whole blood varies. Other variables include activation technique, WBC count, RBC count, patient age, general health, smoker, prednisone (or other wound healing inhibitors). As a common sense guide, if a person can heal a wound, their platelets work to some extent.

Over 15,000 papers published on PubMed regarding PRP, and no reported serious sequelae:

no granuloma, no neoplasia, no necrosis, no infection.

Disclaimer…
Cellular Medicine Association (CMA)
(no idudstry disclaimers)

- 4,000 plus physician (some in this room), are the source of many of these ideas; I am curator not originator for much of the following information.
- 11 years
- 56 Countries
- Physician education, research, patient education.

Examine the following diseases and the rationale behind PRP (you'll see places where landmark studies could be done)

- Stress urinary incontinence
- Urge incontinence
- Post mid-urethral sling sexual dysfunction
- Dyspareunia
  - Lichen sclerosis
  - Post mesh pain
  - Interstitial cystitis
  - Post- episiotomy
  - Vaginismus
  - Pelvic floor tenderness
- Anorgasmia
- Decreased libido
  -

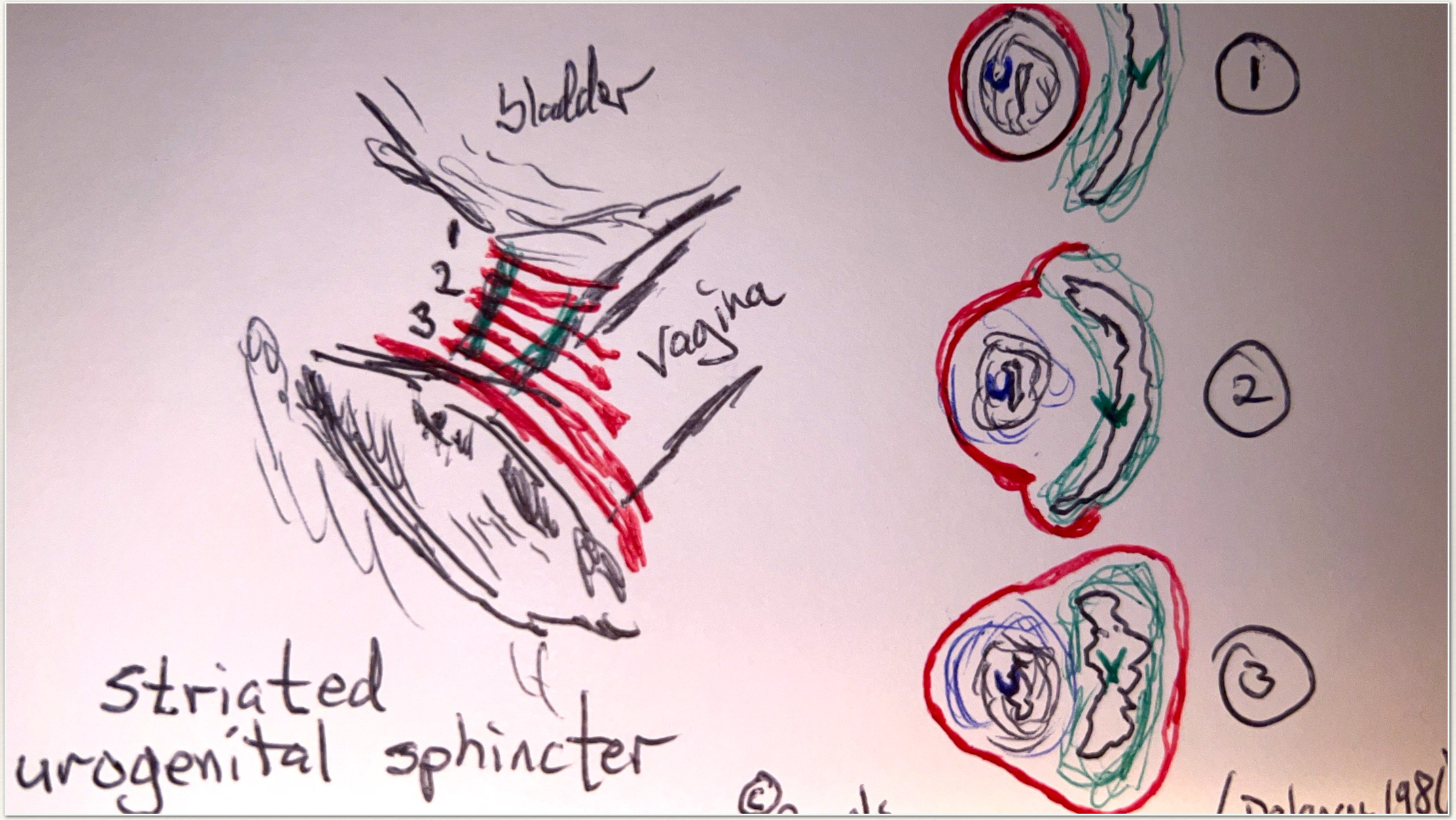
Update on FDA Policies Regarding PRP

For Each Problem, Examine..

- Pathophysiology
- Functional Anatomy
- Strategic PRP Technique Alterations Based on the Above
- Summary of the current literature

Stress Urinary Incontinence

Striated urogenital sphincter accounts for 1/3 of the resting urethral closing pressure [Delancey2017]


bladder
1
2
3
vagina
striated
urogenital sphincter
1
2
3

Striated Urogenital Sphincter

- The number of muscle fibers in the urogenital sphincter decreases with age [Percchini2002]
- Then number of innervating nerves to the striated urogenital sphincter decreases with age [Pandidt2000]
- The function of the striated urogenital sphincter is damaged by childbirth [Delancey2017]

Questions?

- Does the decrease in innervation of the urogenital sphincter lead to the decrease in muscle fibers?
- Or, does the decrease in the muscle fiber occur independently (or in response to changes in blood flow)?

Speculations Based on Decreased Innervation of Urogenital Sphincter…

- The effects of voluntary Kegels would be attenuated by the decreased innervation.
- Activation of the striated muscle of the sphincter externally (Emsella®) would possibly create more contraction than possible by pure volition.
- Neruogenesis and muscle fiber restoration with PRP would be possibly synergistic.

Selection of Papers Demonstrating Neurogenesis with PRP

Chung, Eric. “Regenerative Technology to Restore and Preserve Erectile Function in Men Following Prostate Cancer Treatment: Evidence for Penile Rehabilitation in the Context of Prostate Cancer Survivorship.” *Therapeutic Advances in Urology* 13 (January 1, 2021): 17562872211026420. https://doi.org/10.1177/17562872211026421.

Foy, Christian A., William F. Micheo, and Damien P. Kuffler. “Functional Recovery Following Repair of Long Nerve Gaps in Senior Patient 2.6 Years Posttrauma.” *Plastic and Reconstructive Surgery. Global Open* 9, no. 9 (September 2021): e3831. https://doi.org/10.1097/GOX.0000000000003831.

Kuffler, Damien P. “Platelet-Rich Plasma and the Elimination of Neuropathic Pain.” *Molecular Neurobiology* 48, no. 2 (October 2013): 315–32. https://doi.org/10.1007/s12035-013-8494-7.

Sánchez, Mikel, Eduardo Anitua, Diego Delgado, Peio Sanchez, Roberto Prado, Gorka Orive, and Sabino Padilla. “Platelet-Rich Plasma, a Source of Autologous Growth Factors and Biomimetic Scaffold for Peripheral Nerve Regeneration.” *Expert Opinion on Biological Therapy* 17, no. 2 (February 1, 2017): 197–212. https://doi.org/10.1080/14712598.2017.1259409.

Wu, Yi-No, Chun-Hou Liao, Kuo-Chiang Chen, and Han-Sun Chiang. “Dual Effect of Chitosan Activated Platelet Rich Plasma (CPRP) Improved Erectile Function after Cavernous Nerve Injury.” *Journal of the Formosan Medical Association*, March 27, 2021. https://doi.org/10.1016/j.jfma.2021.01.019.

❖

Selectionof Papers Demonstrating Muscle Revival from PRP

Bernuzzi, Gino, Federica Petraglia, Martina Francesca Pedrini, Massimo De Filippo, Francesco Pogliacomi, Michele Arcangelo Verdano, and Cosimo Costantino. “Use of Platelet-Rich Plasma in the Care of Sports Injuries: Our Experience with Ultrasound-Guided Injection.” *Blood Transfusion* 12, no. Suppl 1 (January 2014): s229–34. https://doi.org/10.2450/2013.0293-12.

Bubnov, Rostyslav, Viacheslav Yevseenko, and Igor Semeniv. “Ultrasound Guided Injections of Platelets Rich Plasma for Muscle Injury in Professional Athletes. Comparative Study.,” n.d., 5.

Le, Adrian D.K., Lawrence Enweze, Malcolm R. DeBaun, and Jason L. Dragoo. “Platelet-Rich Plasma.” *Clinics in Sports Medicine* 38, no. 1 (January 2019): 17–44. https://doi.org/10.1016/j.csm.2018.08.001.

Middleton, Kellie K, Victor Barro, Bart Muller, Satosha Terada, and Freddie H Fu. “Evaluation of the Effects of Platelet-Rich Plasma (PRP) Therapy Involved in the Healing of Sports-Related Soft Tissue Injuries.” *The Iowa Orthopaedic Journal* 32 (2012): 150–63. http://www.ncbi.nlm.nih.gov/pubmed/23576936.

Moraes, Vinícius Y, Mário Lenza, Marcel Jun Tamaoki, Flávio Faloppa, and João Carlos Belloti. “Platelet-Rich Therapies for Musculoskeletal Soft Tissue Injuries.” *The Cochrane Database of Systematic Reviews* 12 (January 2013): CD010071. https://doi.org/10.1002/14651858.CD010071.pub2.

❖

Selection of Papers Showing Help from PRP Injections for Stress Urinary Incontinence

Athanasiou, Stavros, Christos Kalantzis, Dimitrios Zacharakis, Nikolaos Kathopoulis, Artemis Pontikaki, and Themistoklis Grigoriadis. “The Use of Platelet-Rich Plasma as a Novel Nonsurgical Treatment of the Female Stress Urinary Incontinence: A Prospective Pilot Study.” *Female Pelvic Medicine & Reconstructive Surgery* 27, no. 11 (November 2021): e668–72. https://doi.org/10.1097/SPV.0000000000001100.

Callewaert, Geertje, Marina Monteiro Carvalho Mori Da Cunha, Nikhil Sindhwani, Maurilio Sampaolesi, Maarten Albersen, and Jan Deprest. “Cell-Based Secondary Prevention of Childbirth-Induced Pelvic Floor Trauma.” *Nature Reviews Urology* 14, no. 6 (June 2017): 373–85. https://doi.org/10.1038/nrurol.2017.42.

Indian Journal of Medical Ethics. “Cosmetic Surgical Procedures on the Vulva and Vagina - an Overview.” Accessed January 18, 2022. https://ijme.in/articles/cosmetic-surgical-procedures-on-the-vulva-and-vagina-an-overview/.

Ford, Abigail A., Lynne Rogerson, June D. Cody, and Joseph Ogah. “Mid-urethral Sling Operations for Stress Urinary Incontinence in Women.” *Cochrane Database of Systematic Reviews*, no. 7 (2015). https://doi.org/10.1002/14651858.CD006375.pub3.

Gorton, E, S Stanton, A Monga, A K Wiskind, G M Lentz, and D R Bland. “Periurethral Collagen Injection: A Long-Term Follow-up Study.” *BJU International* 84, no. 9 (December 1999): 966–71. http://www.ncbi.nlm.nih.gov/pubmed/10571621.

Joseph, Christine, Kosha Srivastava, Olive Ochuba, Sheila W. Ruo, Tasnim Alkayyali, Jasmine K. Sandhu, Ahsan Waqar, Ashish Jain, and Sujan Poudel. “Stress Urinary Incontinence Among Young Nulliparous Female Athletes.” *Cureus* 13, no. 9 (September 2021). https://doi.org/10.7759/cureus.17986.

Kirchin, Vivienne, Tobias Page, Phil E. Keegan, Kofi OM Atiemo, June D. Cody, Samuel McClinton, Patricia Aluko, and Cochrane Incontinence Group. “Urethral Injection Therapy for Urinary Incontinence in Women.” *The Cochrane Database of Systematic Reviews* 2017, no. 7 (July 2017). https://doi.org/10.1002/14651858.CD003881.pub4.

Lee, Patricia E., Rose C. Kung, and Harold P. Drutz. “PERIURETHRAL AUTOLOGOUS FAT INJECTION AS TREATMENT FOR FEMALE STRESS URINARY INCONTINENCE: A RANDOMIZED DOUBLE-BLIND CONTROLLED TRIAL.” *Journal of Urology* 165, no. 1 (January 2001): 153–58. https://doi.org/10.1097/00005392-200101000-00037.

Long, Cheng-Yu, Kun-Ling Lin, Chin-Ru Shen, Chin-Ru Ker, Yi-Yin Liu, Zi-Xi Loo, Hui-Hua Hsiao, and Yung-Chin Lee. “A Pilot Study: Effectiveness of Local Injection of Autologous Platelet-Rich Plasma in Treating Women with Stress Urinary Incontinence.” *Scientific Reports* 11, no. 1 (December 2021): 1584. https://doi.org/10.1038/s41598-020-80598-2.

Nikolopoulos, Kostis I., Vasilios Pergialiotis, Despina Perrea, and Stergios K. Doumouchtsis. “Restoration of the Pubourethral Ligament with Platelet Rich Plasma for the Treatment of Stress Urinary Incontinence.” *Medical Hypotheses* 90 (May 2016): 29–31. https://doi.org/10.1016/j.mehy.2016.02.019.

O’Connor, Eabhann, Aisling Nic an Riogh, Markos Karavitakis, Serenella Monagas, and Arjun Nambiar. “Diagnosis and Non-Surgical Management of Urinary Incontinence – A Literature Review with Recommendations for Practice.” *International Journal of General Medicine* 14 (August 16, 2021): 4555–65. https://doi.org/10.2147/IJGM.S289314.

Oshiro, Takuma, Ryu Kimura, Keiichiro Izumi, Asuka Ashikari, Seiichi Saito, and Minoru Miyazato. “Changes in Urethral Smooth Muscle and External Urethral Sphincter Function with Age in Rats.” *Physiological Reports* 8, no. 24 (2021): e14643. https://doi.org/10.14814/phy2.14643.

PANDIT, MEGHANA, JOHN O. L. DELANCEY, JAMES A. ASHTON-MILLER, JYOTHSNA IYENGAR, MILA BLAIVAS, and DANIELE PERUCCHINI. “Quantification of Intramuscular Nerves Within the Female Striated Urogenital Sphincter Muscle.” *Obstetrics and Gynecology* 95, no. 6 Pt 1 (June 2000): 797–800. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1192577/.

Perucchini, Daniele, John O.L. DeLancey, James A. Ashton-Miller, Andrzej Galecki, and Gabriel N. Schaer. “Age Effects on Urethral Striated Muscle II. Anatomic Location of Muscle Loss.” *American Journal of Obstetrics and Gynecology* 186, no. 3 (March 2002): 356–60. https://doi.org/10.1067/mob.2002.121090.

Perucchini, Daniele, John OL DeLancey, James A. Ashton-Miller, Ursula Peschers, and Tripti Kataria. “Age Effects on Urethral Striated Muscle I. Changes in Number and Diameter of Striated Muscle Fibers in the Ventral Urethra.” *American Journal of Obstetrics & Gynecology* 186, no. 3 (March 1, 2002): 351–55. https://doi.org/10.1067/mob.2002.121089.

Wiśniewska-Ślepaczuk, Katarzyna, Agnieszka Pieczykolan, Joanna Grzesik-Gąsior, and Artur Wdowiak. “A Review of Aesthetic Gynecologic Procedures for Women.” *Plastic Surgical Nursing* 41, no. 4 (October 2021): 191–202. https://doi.org/10.1097/PSN.0000000000000400.

Zhou, Shukui, Kaile Zhang, Anthony Atala, Oula Khoury, Sean V Murphy, Weixin Zhao, and Qiang Fu. “Stem Cell Therapy for Treatment of Stress Urinary Incontinence: The Current Status and Challenges,” n.d. https://doi.org/10.1155/2016/7060975.

Zubieta, Maria, Rebecca L. Carr, Marcus J. Drake, and Kari Bø. “Influence of Voluntary Pelvic Floor Muscle Contraction and Pelvic Floor Muscle Training on Urethral Closure Pressures: A Systematic Literature Review.” *International Urogynecology Journal* 27, no. 5 (May 2016): 687–96. https://doi.org/10.1007/s00192-015-2856-9.

Lee, Ping-Jui, Yuan-Hong Jiang, and Hann-Chorng Kuo. “A Novel Management for Postprostatectomy Urinary Incontinence: Platelet-Rich Plasma Urethral Sphincter Injection.” *Scientific Reports* | 11 (123AD): 5371. https://doi.org/10.1038/s41598-021-84923-1.

Chiang, Ching-Hsiang, and Hann-Chorng Kuo. “The Efficacy and Mid-Term Durability of Urethral Sphincter Injections of Platelet-Rich Plasma in Treatment of Female Stress Urinary Incontinence.” *Frontiers in Pharmacology* 13 (February 8, 2022): 847520. https://doi.org/10.3389/fphar.2022.847520.

Selection of Papers Demonstrating Improvement of SUI with Magnet (Emsella®)

Azparren, Javier, and Judson Brandeis. “HIFEM PROCEDURE ENHANCES QUALITY OF LIFE OF ELDERLY MEN WITH POST-PROSTATECTOMY INCONTINENCE,” n.d., 6.

Evans, Kimberly, and Julene B Samuels. “FEMALE URINARY INCONTINENCE AND SEXUAL FUNCTION AFTER THE HIFEM® PROCEDURE,” n.d., 2.

Gözlersüzer, Özlem, Bestami Yalvaç, and Basri Çakıroğlu. “Investigation of the Effectiveness of Magnetic Field Therapy in Women with Urinary Incontinence: Literature Review.” *Urologia Journal*, January 9, 2022, 03915603211069010. https://doi.org/10.1177/03915603211069010.

He, Qing, Kaiwen Xiao, Liao Peng, Junyu Lai, Hong Li, Deyi Luo, and Kunjie Wang. “An Effective Meta-Analysis of Magnetic Stimulation Therapy for Urinary Incontinence.” *Scientific Reports* 9 (June 24, 2019): 9077. https://doi.org/10.1038/s41598-019-45330-9.

Samuels, Julene B. “HIFEM TECHNOLOGY – THE NON-INVASIVE TREATMENT OF URINARY INCONTINENCE,” n.d., 7.

Samuels, Julene B., Andrea Pezzella, Joseph Berenholz, and Red Alinsod. “Safety and Efficacy of a Non-Invasive High-Intensity Focused Electromagnetic Field (HIFEM) Device for Treatment of Urinary Incontinence and Enhancement of Quality of Life.” *Lasers in Surgery and Medicine* 51, no. 9 (November 2019): 760–66. https://doi.org/10.1002/lsm.23106.

Silantyeva, Elena, Dragana Zarkovic, Evgeniia Astafeva, Ramina Soldatskaia, Mekan Orazov, Marina Belkovskaya, Mark Kurtser, and Academician of the Russian Academy of Sciences. “A Comparative Study on the Effects of High-Intensity Focused Electromagnetic Technology and Electrostimulation for the Treatment of Pelvic Floor Muscles and Urinary Incontinence in Parous Women: Analysis of Posttreatment Data.” *Female Pelvic Medicine & Reconstructive Surgery* 27, no. 4 (April 2021): 269–73. https://doi.org/10.1097/SPV.0000000000000807.

❖

Urethra

- Within the urethra lies a vascular plexus with *arteriovenous anastomoses*.
- Blood flow can be directed into or away from venues to inflate or deflate them.
- Hormones can affect the function of these venules.
- This ***tumescence-like function of the urethra contributes to the closing pressure [Huisman1983] [Delancey2017].***

Speculation…

Injection of the urethra wall with PRP may contribute to the benefits seen with PRP for stress urinary incontinence

Another Selection of Papers Showing Neovacularization from PRP

Araujo-Gutierrez, Raquel, Jeffrey L. Van Eps, Jacob C. Scherba, Albert Thomas Anastasio, Fernando Cabrera, Cory J. Vatsaas, Keith Youker, and Joseph S. Fernandez Moure. “Platelet Rich Plasma Concentration Improves Biologic Mesh Incorporation and Decreases Multinucleated Giant Cells in a Dose Dependent Fashion.” *Journal of Tissue Engineering and Regenerative Medicine* 15, no. 11 (2021): 1037–46. https://doi.org/10.1002/term.3247.

Bindal, Priyadarshni, Nareshwaran Gnanasegaran, Umesh Bindal, Nazmul Haque, Thamil Selvee Ramasamy, Wen Lin Chai, and Noor Hayaty Abu Kasim. “Angiogenic Effect of Platelet-Rich Concentrates on Dental Pulp Stem Cells in Inflamed Microenvironment.” *Clinical Oral Investigations* 23, no. 10 (October 2019): 3821–31. https://doi.org/10.1007/s00784-019-02811-5.

Li, Yuan, Shan Mou, Peng Xiao, Guining Li, Jialun Li, Jing Tong, Jiecong Wang, Jie Yang, Jiaming Sun, and Zhenxing Wang. “Delayed Two Steps PRP Injection Strategy for the Improvement of Fat Graft Survival with Superior Angiogenesis.” *Scientific Reports* 10 (March 23, 2020): 5231. https://doi.org/10.1038/s41598-020-61891-6.

Nolan, Grant Switzer, Oliver John Smith, Susan Heavey, Gavin Jell, and Afshin Mosahebi. “Histological Analysis of Fat Grafting with Platelet-rich Plasma for Diabetic Foot Ulcers—A Randomised Controlled Trial.” *International Wound Journal* 19, no. 2 (June 24, 2021): 389–98. https://doi.org/10.1111/iwj.13640.

Norooznezhad, Amir Hossein. “Decreased Pain in Patients Undergoing Pilonidal Sinus Surgery Treated with Platelet-Rich Plasma Therapy: The Role of Angiogenesis.” *Advances in Skin & Wound Care* 33, no. 1 (January 2020): 8. https://doi.org/10.1097/01.ASW.0000615376.97232.0a.

Saputro, Iswinarno Doso, Sitti Rizaliyana, and Dhitta Aliefia Noverta. “The Effect of Allogenic Freeze-Dried Platelet-Rich Plasma in Increasing the Number of Fibroblasts and Neovascularization in Wound Healing.” *Annals of Medicine and Surgery* 73 (January 3, 2022): 103217. https://doi.org/10.1016/j.amsu.2021.103217.

Sclafani, Anthony P., and Steven A. McCormick. “Induction of Dermal Collagenesis, Angiogenesis, and Adipogenesis in Human Skin by Injection of Platelet-Rich Fibrin Matrix.” *Archives of Facial Plastic Surgery* 14, no. 2 (April 2012): 132–36. https://doi.org/10.1001/archfacial.2011.784.

Zhang, X.-L., K.-Q. Shi, P.-T. Jia, L.-H. Jiang, Y.-H. Liu, X. Chen, Z.-Y. Zhou, Y.-X. Li, and L.-S. Wang. “Effects of Platelet-Rich Plasma on Angiogenesis and Osteogenesis-Associated Factors in Rabbits with Avascular Necrosis of the Femoral Head.” *European Review for Medical and Pharmacological Sciences* 22, no. 7 (April 2018): 2143–52. https://doi.org/10.26355/eurrev_201804_14748.

❖

The longitudinal smooth muscle of the urethra
also contributes to the closing pressure of the urethra;
but, smooth muscle can be contracted/exercised
neither by volition nor by magnet.

Speculation

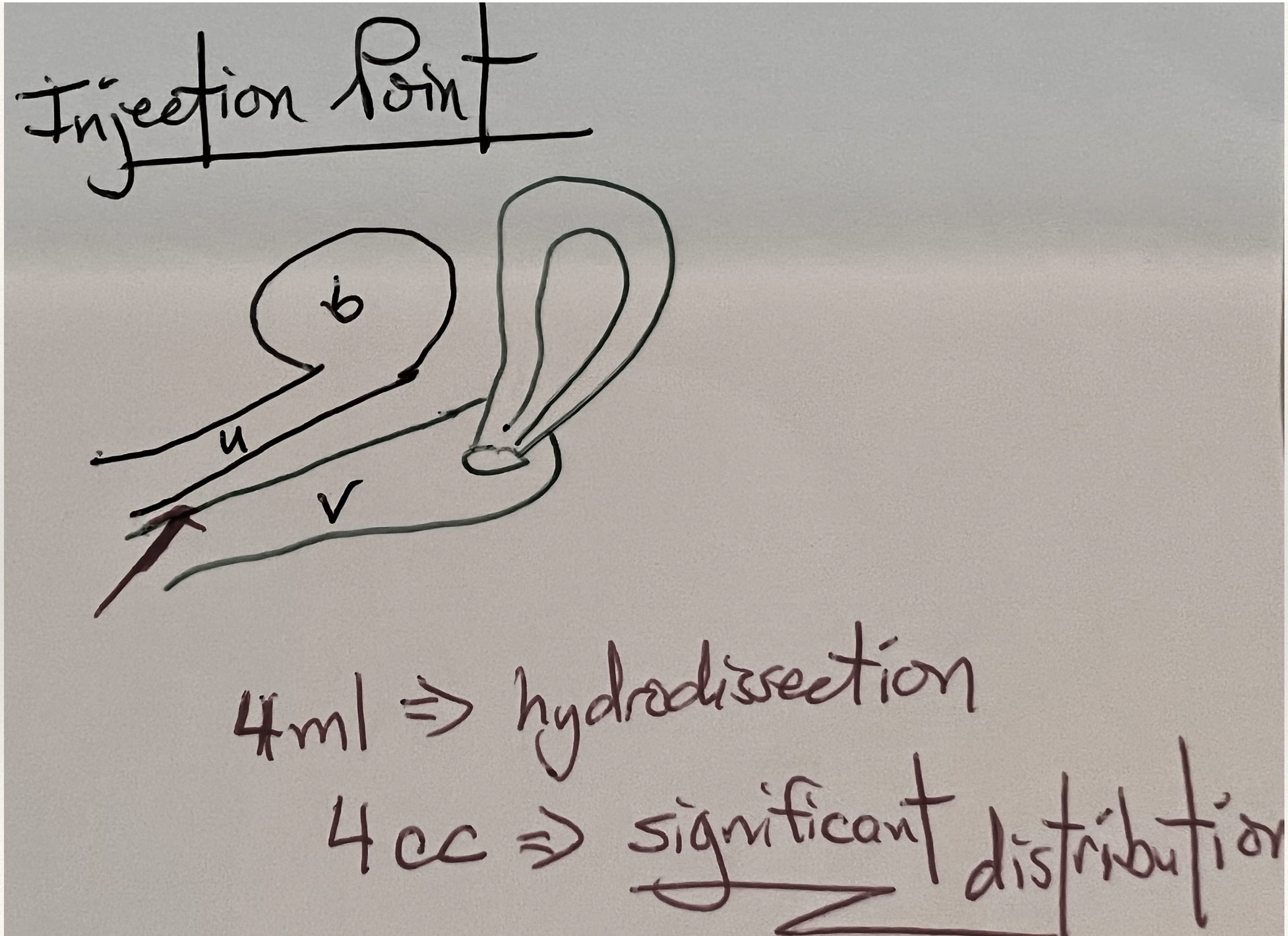
- ***Since PRP has been shown to revive muscle fibers,*** injection of the urethral smooth muscle may account for some of the benefits of PRP injections for stress urinary incontinence.

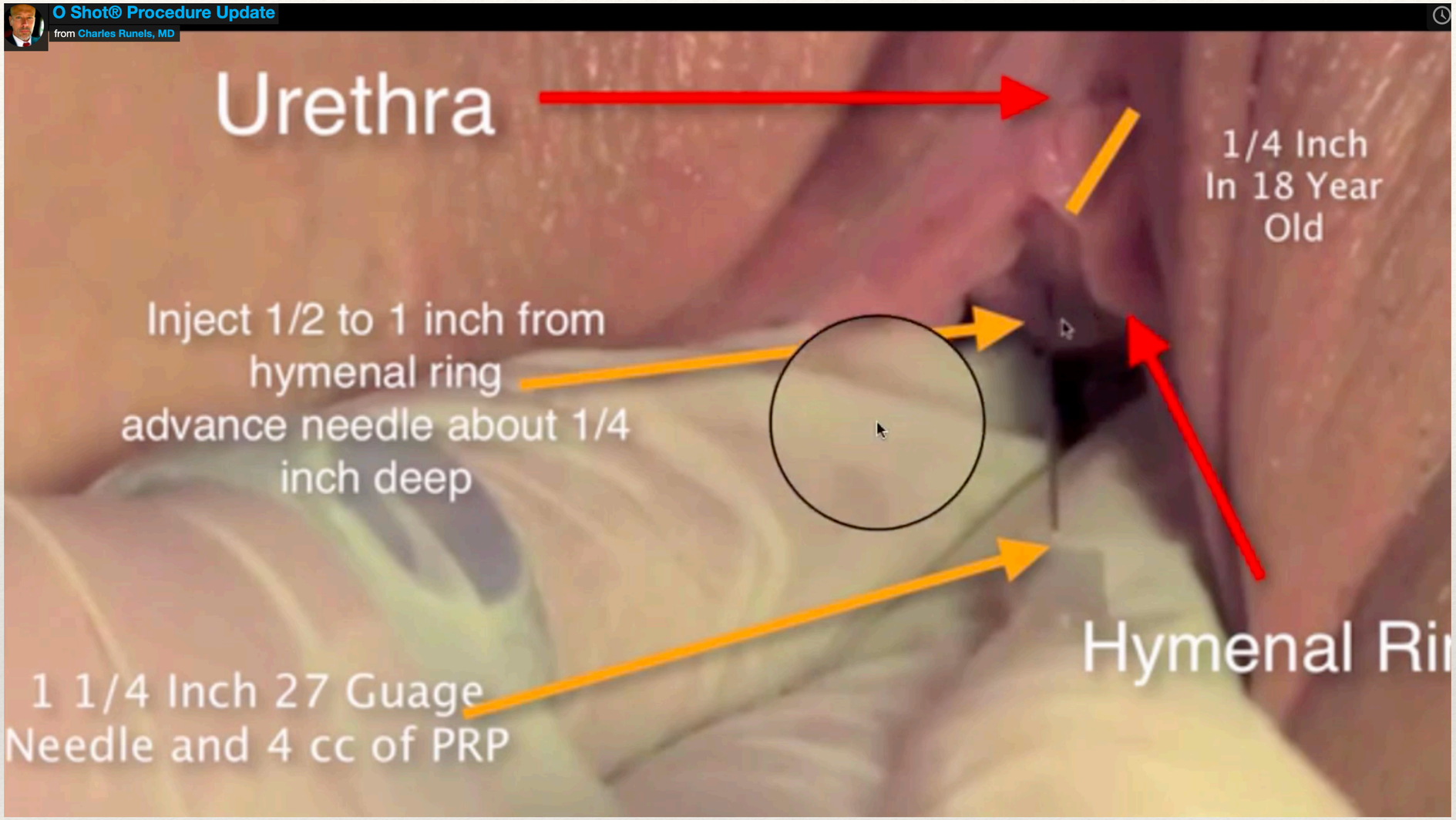
Urge Incontinence

Urge Incontinence

- Speculation: in cases of urge incontinence secondary to peripheral nerve involvement, PRP may be of benefit.

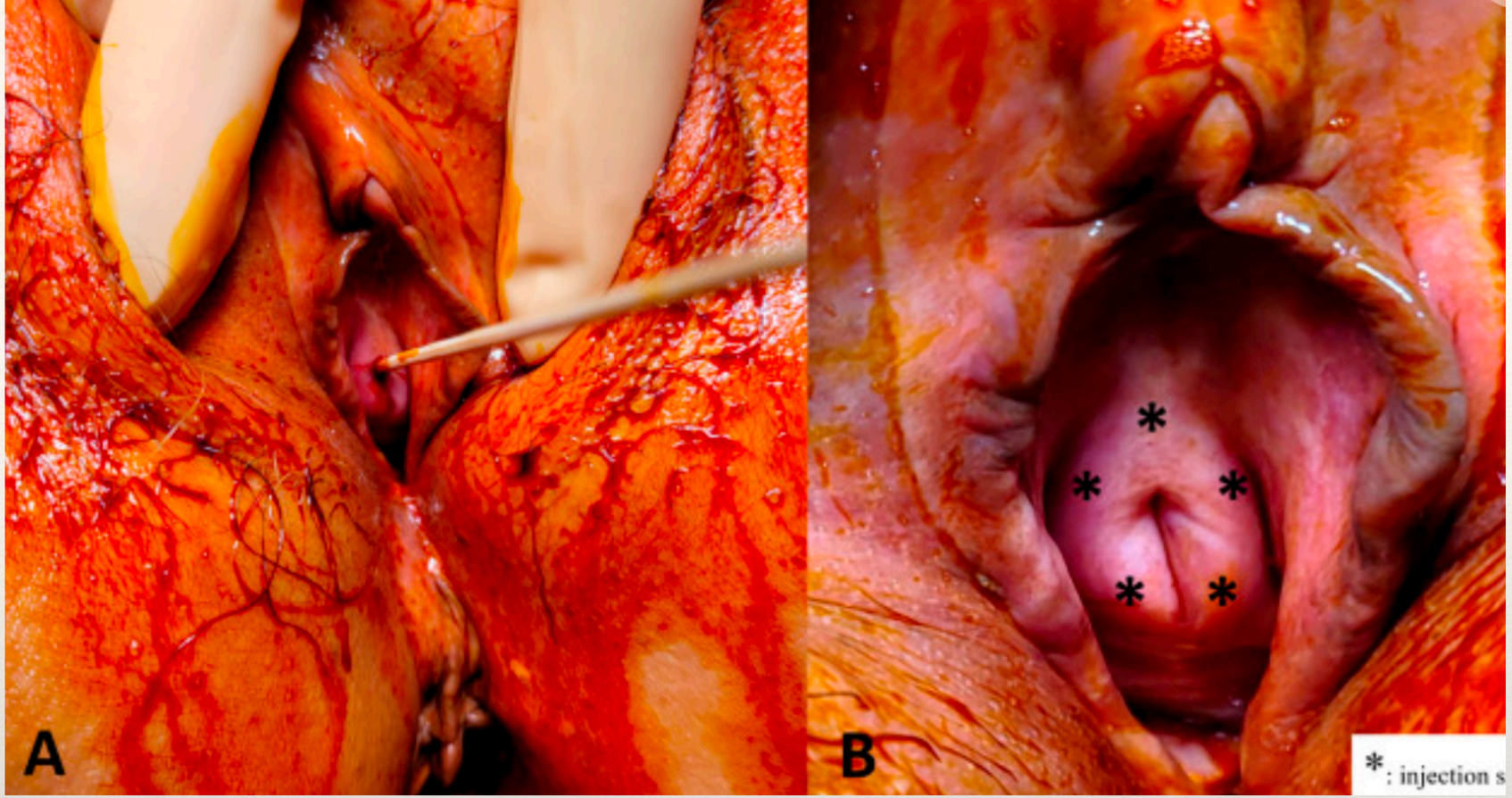
Functional Anatomy Based Technique


Injection Point
b
u
v
4ml ⇒ hydrodissection
4cc ⇒ significant distribution



Runels, Charles, Hugh Melnick, Ernest Debourbon, and Lisbeth Roy. "A Pilot Study of the Effect of Localized Injections of Autologous Platelet Rich Plasma (PRP) for the Treatment of Female Sexual Dysfunction." *Women's Health Care* 3, no. 4 (2014): 3–6. https://doi.org/10.4172/2167-0420.100016.

Another Technique



Chiang, Ching-Hsiang, and Hann-Chorng Kuo. “The Efficacy and Mid-Term Durability of Urethral Sphincter Injections of Platelet-Rich Plasma in Treatment of Female Stress Urinary Incontinence.” *Frontiers in Pharmacology* 13 (February 8, 2022): 847520. https://doi.org/10.3389/fphar.2022.847520.

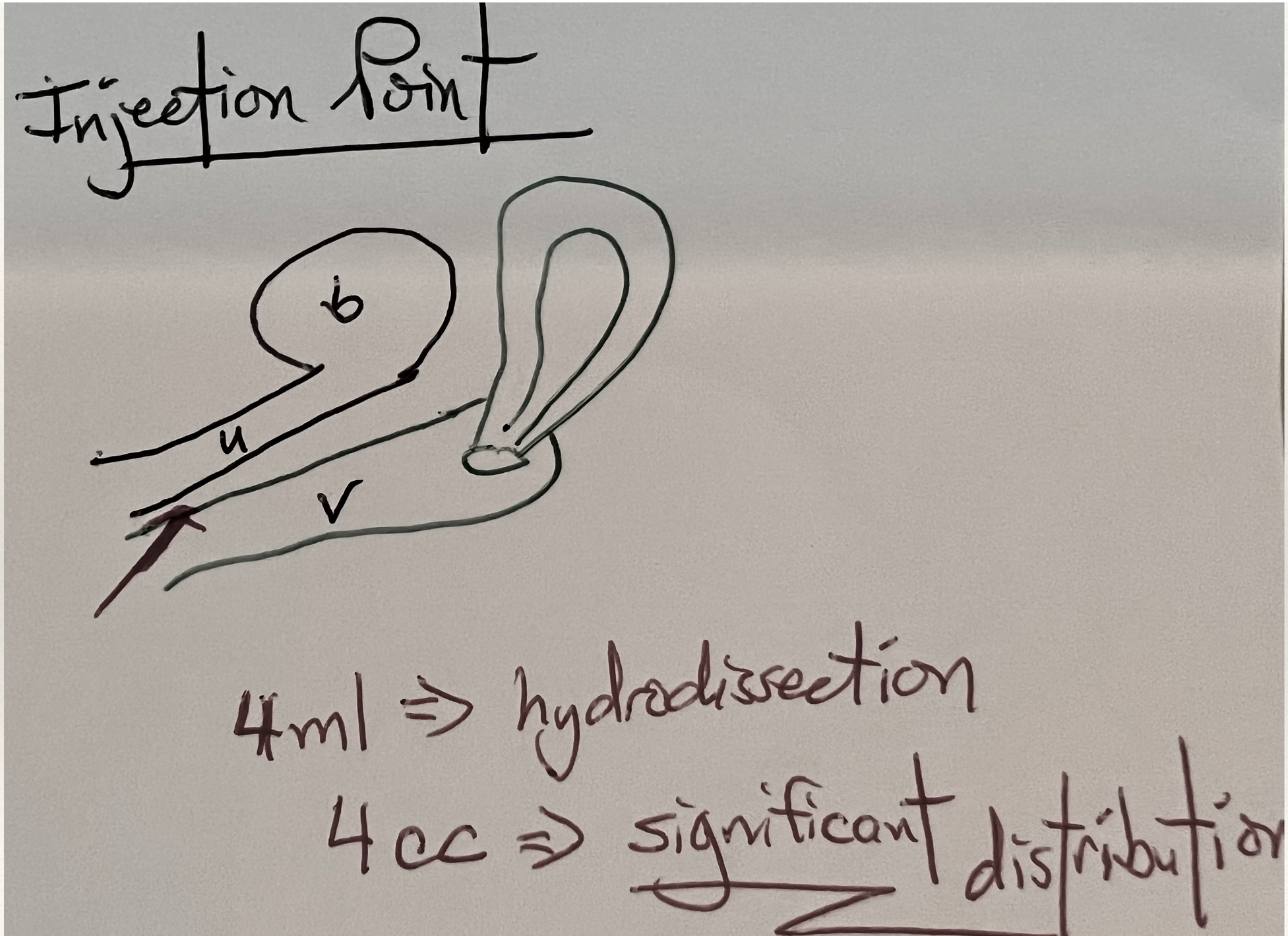
Post Mid-Urethral Sling

Placing a midurethral sling “adversely affects orgasm and sexual satisfaction in 1 in 11 women.”

“MUS placement interrupts tissue with glandular, vascular, and neuronal structures within the periuethral space adjacent to the anterior vaginal wall. Disruption of the prostatic glandular tissue and neurovascular structures may be a root cause of orgasmic dysfunction and diminished sexual satisfaction evident in women following MUS implantation.”

Gaudet, D., D.G. Clohosey, J.L. Hannan, S.W. Goldstein, N. Szell, B.R. Komisarek, M.A. Harvey, et al. “249 Midurethral Sling Placement Disrupts Periurethral Neurovascular and Glandular Structures near Anterior Vaginal Wall: Potential Role in Female Sexual Dysfunction.” *The Journal of Sexual Medicine* 15, no. 7 (July 2018): S221–22. https://doi.org/10.1016/j.jsxm.2018.04.214.

❖


Injection Point
b
u
v
4ml ⇒ hydrodissection
4cc ⇒ significant distribution

Dsypareunia

- Lichen Sclerosus
- Mesh
- Interstitial Cystitis
- Post Breast Cancer (dryness)
- Episiotomy
- Vaginismua
- Pelvic Floor Tenderness

Lichen Sclerosus

- Autoimmune process
- Sclerosis
- Phimosis
- Decrease blood flow
- Fissures

Lichen Slcerosus

Selection of Papers Showing Down-regulation of the Autoimmune System from PRP

Anitua, Eduardo, Ander Pino, Libe Aspe, MaIsabel Martínez, Adrian García, Felipe Goñi, and María Troya. “Anti-Inflammatory Effect of Different PRGF Formulations on Cutaneous Surface.” *Journal of Tissue Viability* 30, no. 2 (May 1, 2021): 183–89. https://doi.org/10.1016/j.jtv.2021.02.011.

Behnia-Willison, Fariba, Nina Reza Pour, Behrang Mohamadi, Nadia Willison, Madeleine Rock, Ian W. Holten, Robert O’Shea, and Joseph Miller. “Use of Platelet-Rich Plasma for Vulvovaginal Autoimmune Conditions Like Lichen Sclerosus.” *Plastic and Reconstructive Surgery Global Open* 4, no. 11 (November 23, 2016): e1124. https://doi.org/10.1097/GOX.0000000000001124.

Borhani-Haghighi, Maryam, and Yousef Mohamadi. “The Therapeutic Effect of Platelet-Rich Plasma on the Experimental Autoimmune Encephalomyelitis Mice.” *Journal of Neuroimmunology* 333 (August 15, 2019): 476958. https://doi.org/10.1016/j.jneuroim.2019.04.018.

Huber, Stephany Cares, Silmara Aparecida de Lima Montalvão, Zoraida Sachetto, José Fabio Santos Duarte Lana, and Joyce Maria Annichino-Bizzacchi. “Characterization of Autologous Platelet Rich Plasma (PRP) and Its Biological Effects in Patients with Behçet’s Disease.” *Regenerative Therapy* 18 (December 2021): 339–46. https://doi.org/10.1016/j.reth.2021.08.010.

Pototschnig, Hanno, and Maximilian T. Madl. “Successful Treatment of Alopecia Areata Barbae with Platelet-Rich Plasma.” *Cureus* 12, no. 4 (April 1, 2020): e7495. https://doi.org/10.7759/cureus.7495.

Tong, Shichao, Changqing Zhang, and Ji Liu. “Platelet-Rich Plasma Exhibits Beneficial Effects for Rheumatoid Arthritis Mice by Suppressing Inflammatory Factors.” *Molecular Medicine Reports* 16, no. 4 (October 2017): 4082–88. https://doi.org/10.3892/mmr.2017.7091.

———. “Platelet-Rich Plasma Exhibits Beneficial Effects for Rheumatoid Arthritis Mice by Suppressing Inflammatory Factors.” *Molecular Medicine Reports* 16, no. 4 (October 2017): 4082–88. https://doi.org/10.3892/mmr.2017.7091.

Vazquez, Oscar Adrian, Rachel H. Safeek, Jacob Komberg, and Hilton Becker. “Alopecia Areata Treated with Advanced Platelet-Rich Fibrin Using Micronization.” *Plastic and Reconstructive Surgery Global Open* 10, no. 1 (January 18, 2022): e4032. https://doi.org/10.1097/GOX.0000000000004032.

❖

Selection of Papers Showing Benefit of PRP for Lichen Sclerosus

Behnia-Willison, Fariba, Nina Reza Pour, Behrang Mohamadi, Nadia Willison, Madeleine Rock, Ian W. Holten, Robert O'Shea, and Joseph Miller. "Use of Platelet-Rich Plasma for Vulvovaginal Autoimmune Conditions Like Lichen Sclerosus:" *Plastic and Reconstructive Surgery - Global Open* 4, no. 11 (November 2016): e1124. https://doi.org/10.1097/GOX.0000000000001124.

Casabona, Francesco, Ilaria Gambelli, Federica Casabona, Pierluigi Santi, Gregorio Santori, and Ilaria Baldelli. "Autologous Platelet-Rich Plasma (PRP) in Chronic Penile Lichen Sclerosus: The Impact on Tissue Repair and Patient Quality of Life." *International Urology and Nephrology* 49, no. 4 (2017): 573–80. https://doi.org/10.1007/s11255-017-1523-0.

———. "Autologous Platelet-Rich Plasma (PRP) in Chronic Penile Lichen Sclerosus: The Impact on Tissue Repair and Patient Quality of Life." *International Urology and Nephrology* 49, no. 4 (April 2017): 573–80. https://doi.org/10.1007/s11255-017-1523-0.

Casabona, Francesco, Virginia Priano, Valerio Vallerino, Angela Cogliandro, and Giorgio Lavagnino. "New Surgical Approach to Lichen Sclerosus of the Vulva: The Role of Adipose-Derived Mesenchymal Cells and Platelet-Rich Plasma in Tissue Regeneration." *Plastic and Reconstructive Surgery* 126, no. 4 (2010): 210e–11.

Franic, D, Z Iternička, and M Franić-Ivanišević. "Platelet-Rich Plasma (PRP) for the Treatment of Vulvar Lichen Sclerosus in a Premenopausal Woman: A Case Report." *Case Reports in Women's Health* 18 (April 2018): e00062. https://doi.org/10.1016/j.crwh.2018.e00062.

Goldstein, Andrew T., Michelle King, Charles Runels, Meghan Gloth, and Richard Pfau. "Intradermal Injection of Autologous Platelet-Rich Plasma for the Treatment of Vulvar Lichen Sclerosus." *Journal of the American Academy of Dermatology* 76, no. 1 (January 2017): 158–60. https://doi.org/10.1016/j.jaad.2016.07.037.

Goldstein, Andrew T., Leia Mitchell, Vaishnavi Govind, and Debra Heller. "A Randomized Double-Blind Placebo Controlled Trial of Autologous Platelet Rich Plasma Intradermal Injections for the Treatment of Vulvar Lichen Sclerosus." *Journal of the American Academy of Dermatology*, January 2019. https://doi.org/10.1016/j.jaad.2018.12.060.

Goldstein, Andrew T., Caroline F. Pukall, Candace Brown, Sophie Bergeron, Amy Stein, and Susan Kellogg-Spadt. "Vulvodynia: Assessment and Treatment." *The Journal of Sexual Medicine* 13, no. 4 (April 2016): 572–90. https://doi.org/10.1016/j.jsxm.2016.01.020.

Gunthert, A.R., K. Duclos, B.G. Jahns, and et al. "Clinical Scoring System for Vulvar Lichen Sclerosus." *J Sex Med* 9 (2012): 2342–50.

"ISSVD 2015 Abstracts." *Journal of Lower Genital Tract Disease* 19, no. 3 (July 2015): S1–25. https://doi.org/10.1097/lgt.0000000000000121.

Krapf, Jill M, Leia Mitchell, Michelle A Holton, and Andrew T Goldstein. "Vulvar Lichen Sclerosus: Current Perspectives." *International Journal of Women's Health* Volume 12 (January 2020): 11–20. https://doi.org/10.2147/IJWH.S191200.

Krogh, G von, K Dahlman-Ghozlan, and S Syrjänen. "Potential Human Papillomavirus Reactivation Following Topical Corticosteroid Therapy of Genital Lichen Sclerosus and Erosive Lichen Planus." *Journal of the European Academy of Dermatology and Venereology: JEADV* 16, no. 2 (March 2002): 130–33. http://www.ncbi.nlm.nih.gov/pubmed/12046814.

Lee, A., J. Bradford, and G. Fischer. "Long-Term Management of Adult Vulvar Lichen Sclerosus: A Prospective Cohort Study of 507 Women." *JAMA Dermatol* 151 (2015): 1061–67.

Marnach, Mary L., and Rochelle R. Torgerson. "Therapeutic Interventions for Challenging Cases of Vulvar Lichen Sclerosus and Lichen Planus." *Obstetrics & Gynecology* 138, no. 3 (September 2021): 374–78. https://doi.org/10.1097/AOG.0000000000004498.

Mitchell, Leia, Andrew T. Goldstein, Debra Heller, Theodora Mautz, Chelsea Thorne, So Yeon Joyce Kong, Maria E. Sophocles, Hillary Tolson, and Jill M. Krapf. "Fractionated Carbon Dioxide Laser for the Treatment of Vulvar Lichen Sclerosus: A Randomized Controlled Trial." *Obstetrics & Gynecology* 137, no. 6 (June 2021): 979–87. https://doi.org/10.1097/AOG.0000000000004409.

Msc, Michelle King, Hillary Tolson, Charles Runels, Meghan Gloth, Richard Pfau, and Andrew T Goldstein. "Autologous Platelet Rich Plasma (PRP) Intradermal Injections for the Treatment of Vulvar Lichen Sclerosus." *Journal of Lower Genital Tract Disease* 19, no. 3 (2015): S1–25. http://journals.lww.com/jlgtd/Fulltext/2015/07001/ISSVD_2015_Abstracts.2.aspx.

"New Surgical Approach to Lichen Sclerosus of the Vulva: The Role of Adipose-Derived Mesenchymal Cells and Platelet-Rich Plasma in Tissue Regeneration. Casabona F1, Priano V." *Plast Reconstr Surg*., n.d.

Smith, J G. "The Journal of the American Academy of Dermatology." *International Journal of Dermatology* 18, no. 6 (2005): 466–67. http://www.ncbi.nlm.nih.gov/pubmed/19539853.

Tedesco, M., G. Pranteda, G. Chichierchia, and et al. "The Use of PRP (Platelet-Rich Plasma) in Patients Affected by Genital Lichen Sclerosus: Clinical Analysis and Results." *J Eur Acad Dermatol Venereol* 33 (2019): e58–59.

Vittrup, G., L. Mørup, T. Heilesen, D. Jensen, S. Westmark, and D. Melgaard. "The Quality of Life and Sexuality in Women with Lichen Sclerosus – A Cross Sectional Study." *Clinical and Experimental Dermatology* n/a, no. n/a. Accessed August 31, 2021. https://doi.org/10.1111/ced.14893.

Selection of Papers Showing Benefit of PRP for Scars

Alves, Rubina, and Ramon Grimalt. “A Review of Platelet-Rich Plasma: History, Biology, Mechanism of Action, and Classification.” *Skin Appendage Disorders* 4, no. 1 (January 2018): 18–24. https://doi.org/10.1159/000477353.

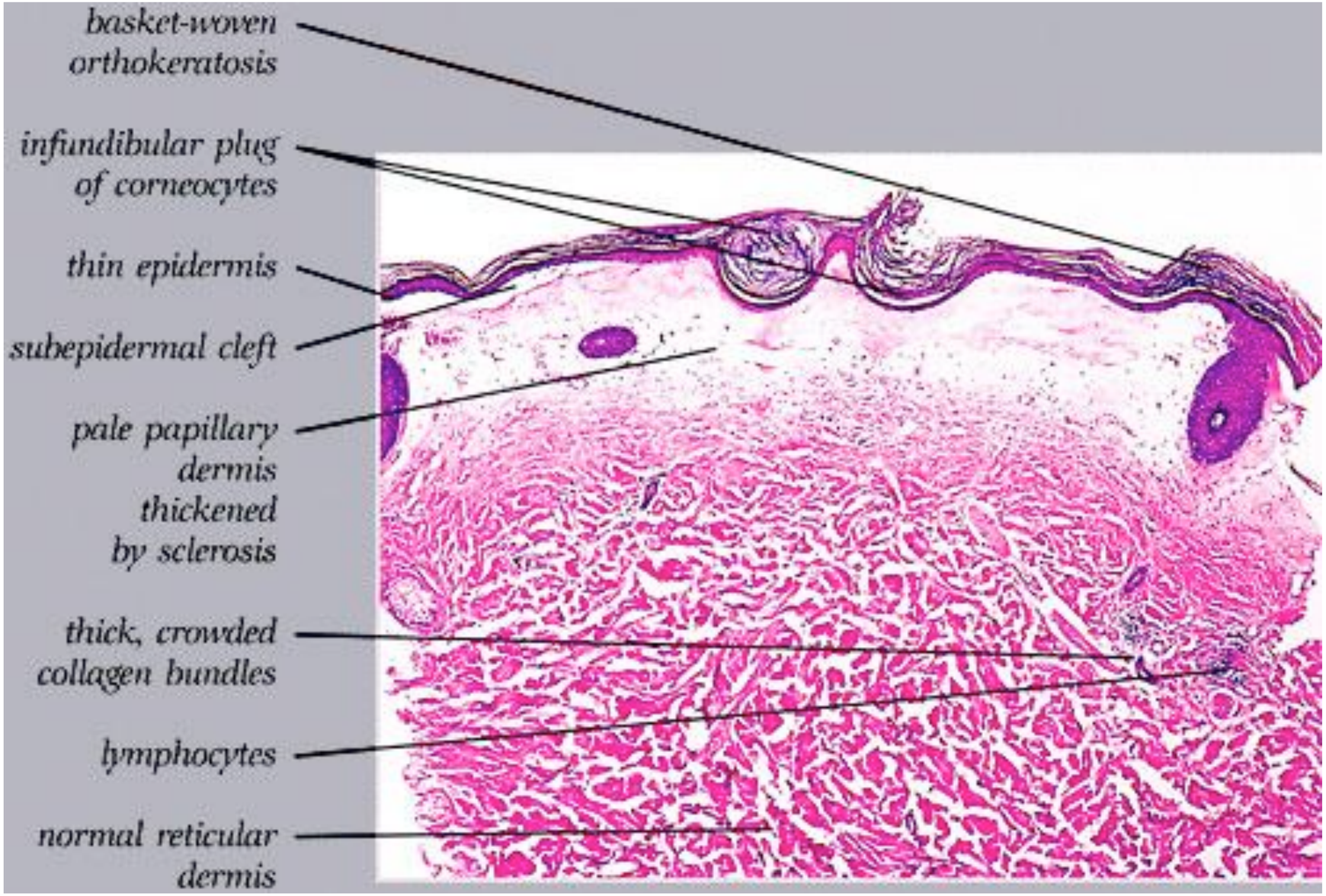
Number 5, STL Volume 24. “Platelet-Rich Plasma (PRP): Current Applications in Dermatology.” Accessed August 26, 2021. https://www.skintherapyletter.com/dermatology/platelet-rich-plasma-prp/.

Refahee, Shaimaa Mohsen, Mamdouh A Aboulhassan, Omniya Abdel Aziz, Dawlat Emara, Hadeel M Seif, El Dein, Basma Gamal Moussa, and Malek Abu Sneineh. “Is PRP Effective in Reducing the Scar Width of Primary Cleft Lip Repair? A Randomized Controlled Clinical Study,” 2019, 1–8. https://doi.org/10.1177/1055665619884455.

Sánchez, Mikel, Eduardo Anitua, Diego Delgado, Peio Sanchez, Roberto Prado, Gorka Orive, and Sabino Padilla. “Platelet-Rich Plasma, a Source of Autologous Growth Factors and Biomimetic Scaffold for Peripheral Nerve Regeneration.” *Expert Opinion on Biological Therapy* 17, no. 2 (February 1, 2017): 197–212. https://doi.org/10.1080/14712598.2017.1259409.

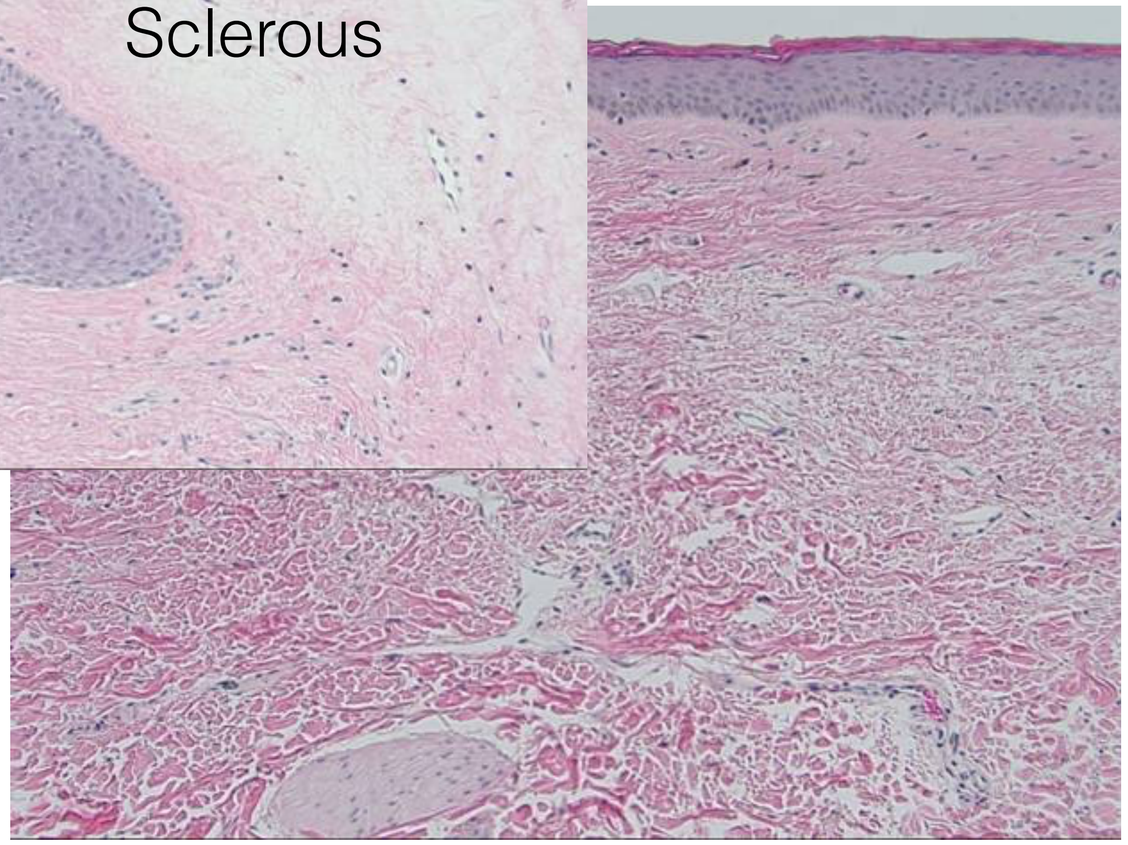
❖

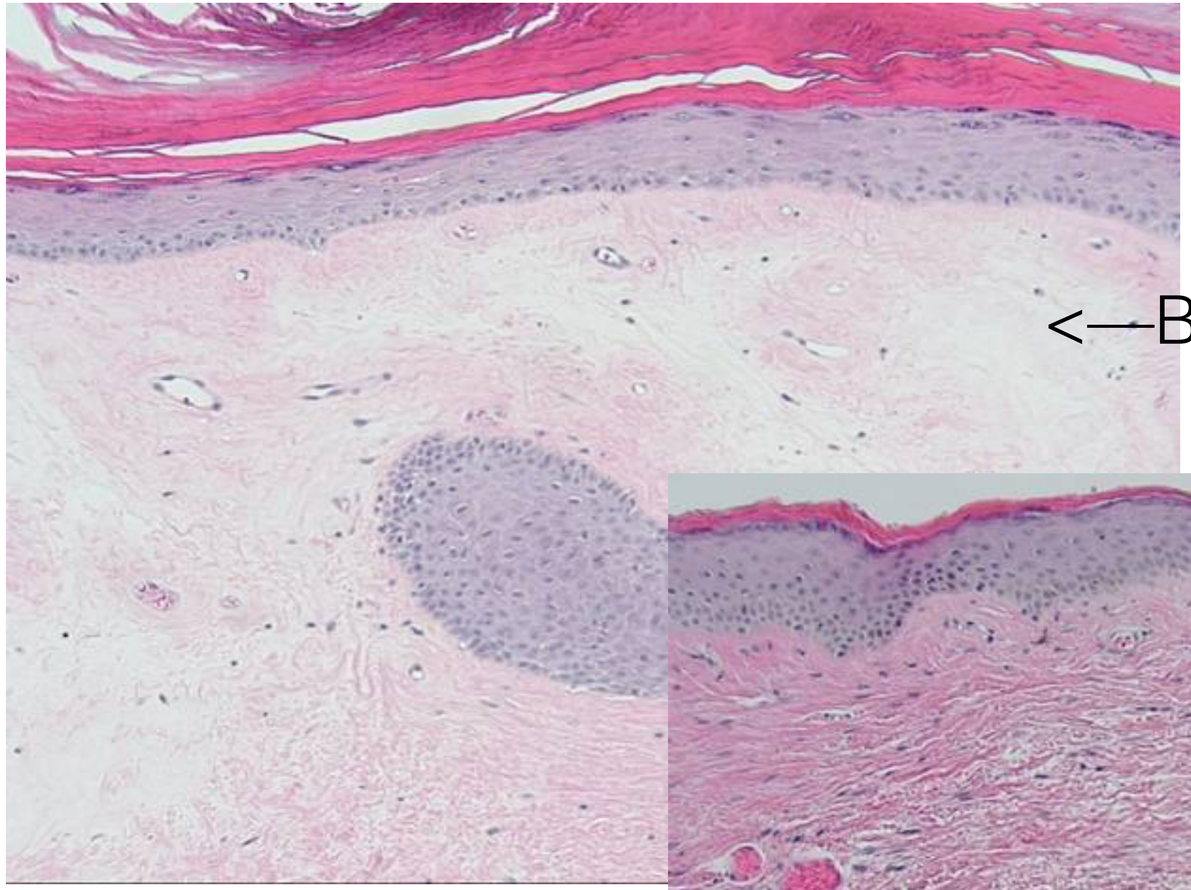
Microscopy of Lichen Sclerosus



Before…

After

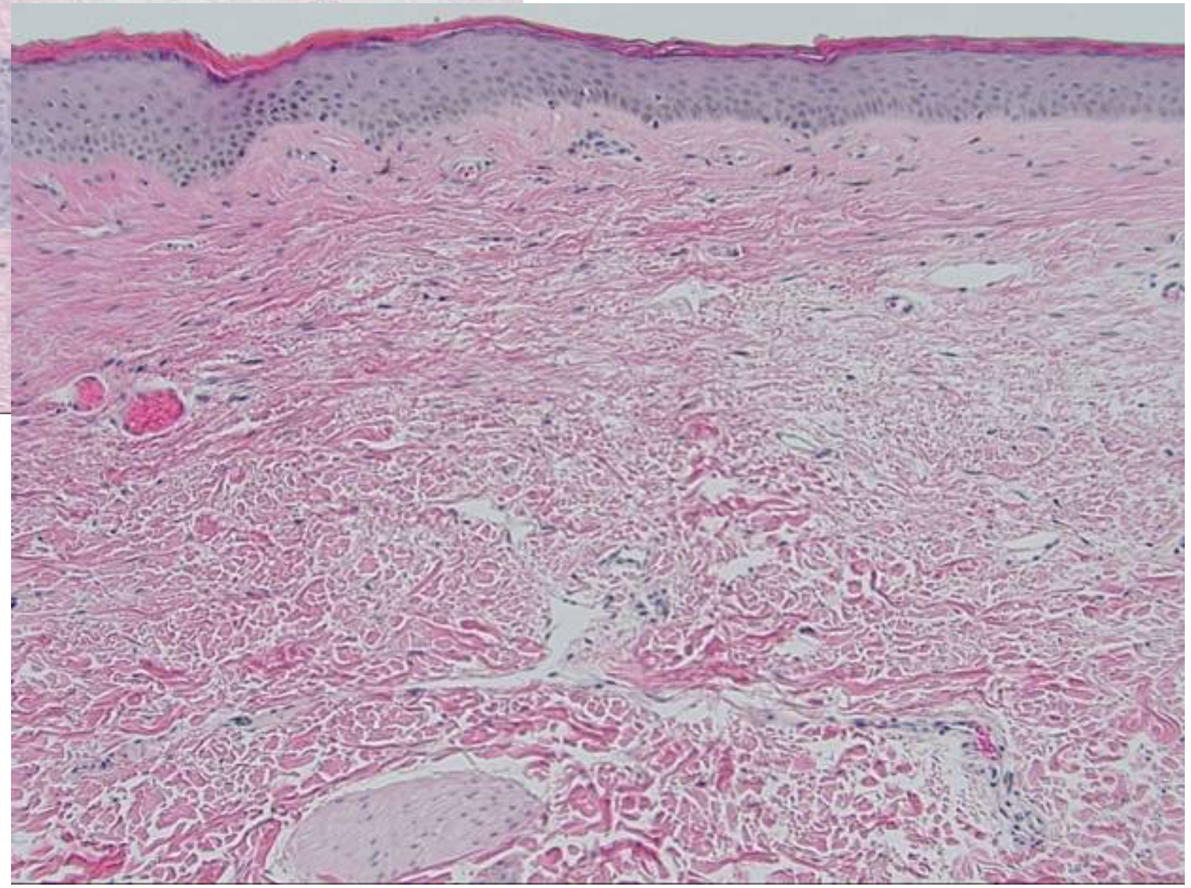


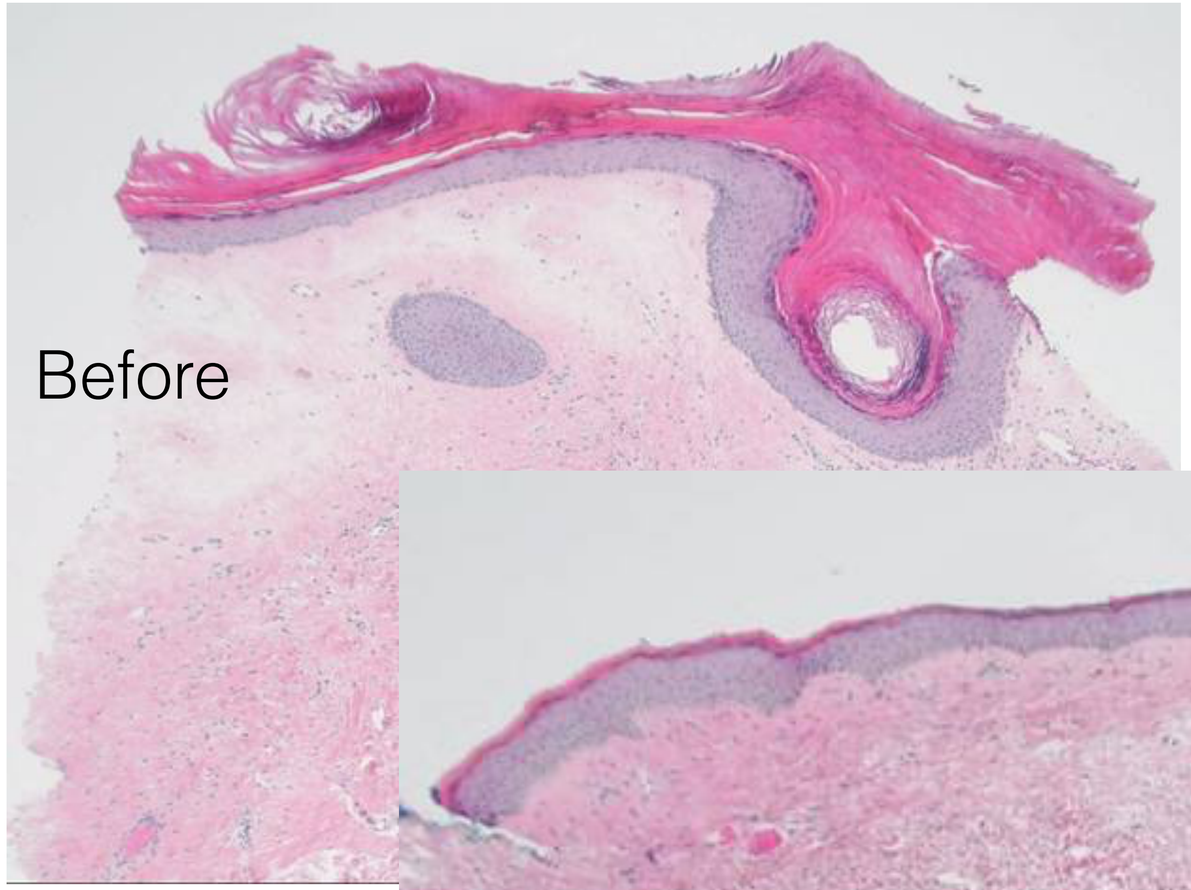


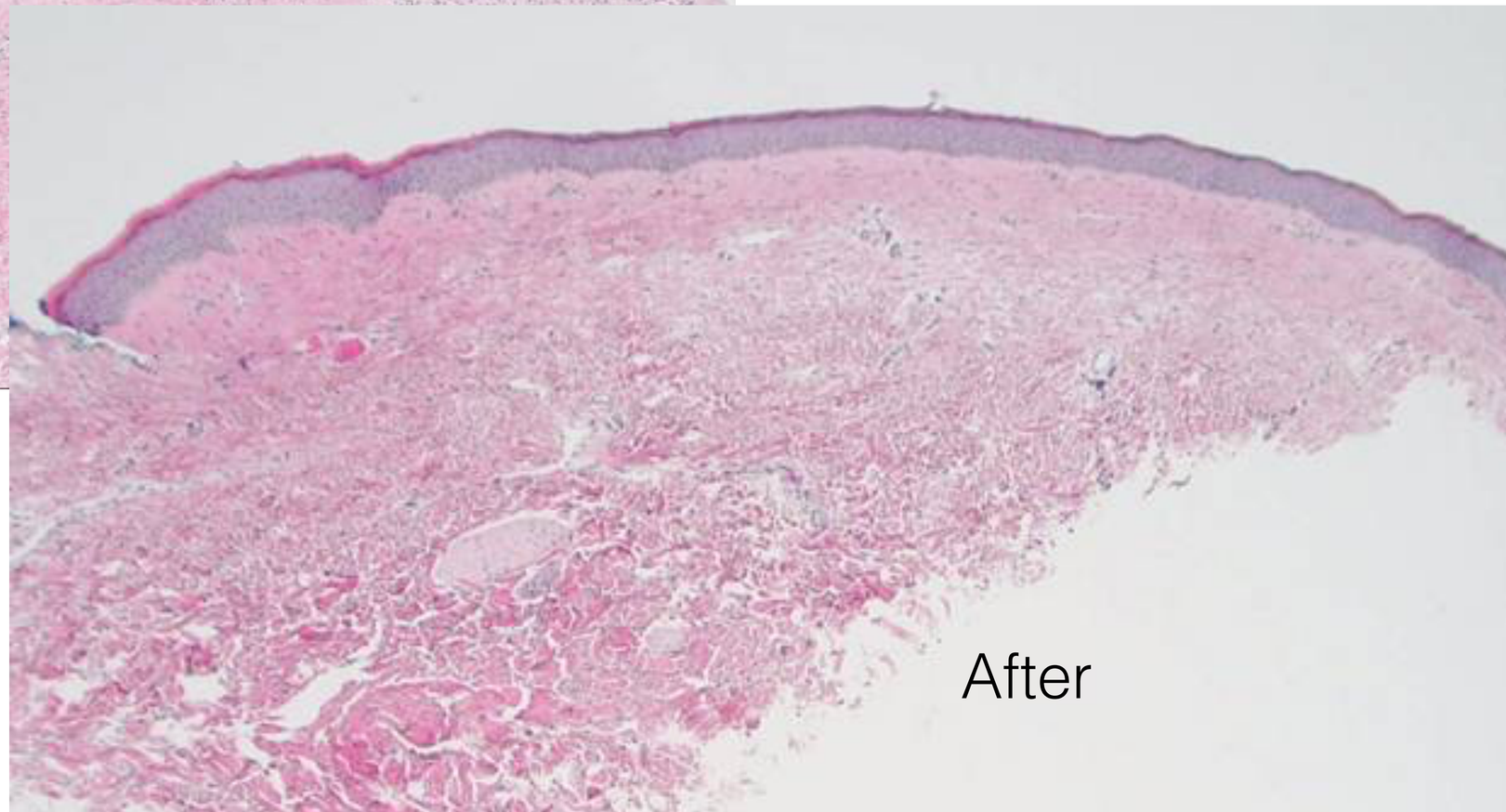
- *Hyperkeratosis*
- *Follicular plugging*
- *Atrophy*

<—Before

After—>



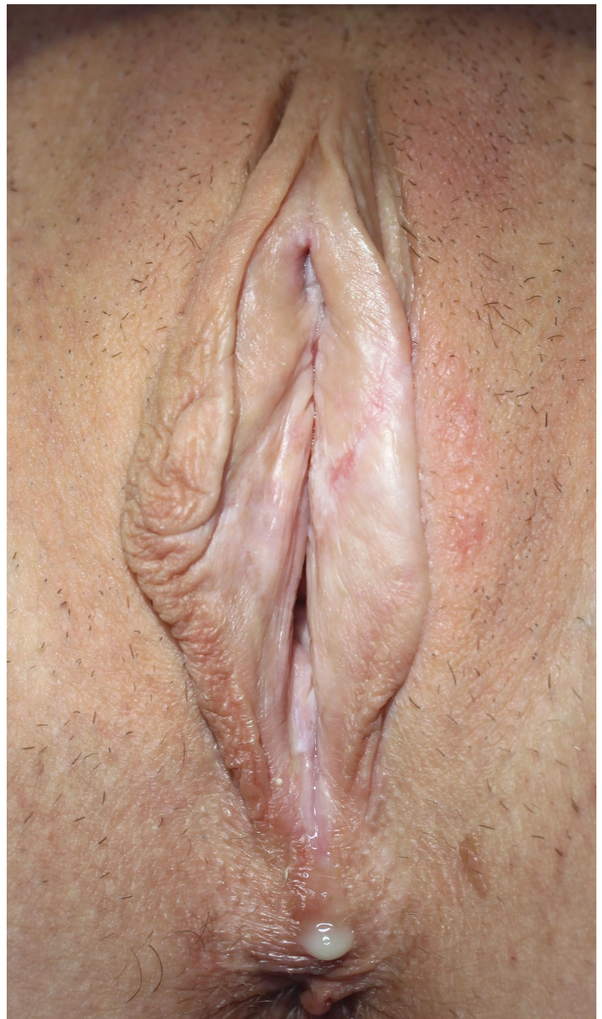

Before


After

The International Society
for the Study of Vulvovaginal Disease

Before

After



Kathleen Posey, MD

Posey K, Runels C, In-Office Surgery and Use of Platelet Rich Plasma for Treatment of Vulvar Lichen Sclerosus to Alleviate Painful Sexual Intercourse, Journal of Lower Genital Tract Disease. 2017 Vol 21, #45. S14

After 10 years of Clobetesol. Marine who served active duty with this.

Off steroids. Instead micronedling & injecting PRP, and surgery for phimosis, Altar® cream, and daily UVB

Courtesy Alexandra Runnels, MD, ACOG

Techniques

- Surgery (Phimosis)
- Injection
- Microneedling

Post Mesh Pain

- PRP known to help with wound healing and scar tx

Selection of Papers Showing PRP Helpful for Wound Healing (1,964 on PubMed)

- Autologous Platelet-Rich Plasma vs Conventional Dressing in the Management of Chronic Diabetic Foot Ulcers - PubMed." Accessed March 7, 2022. https://pubmed.ncbi.nlm.nih.gov/35108667/.
Chicharro-Alcántara, Deborah, Mónica Rubio-Zaragoza, Elena Damiá-Giménez, José M. Carrillo-Poveda, Belén Cuervo-Serrato, Pau Peláez-Gorrea, and Joaquín J. Sopena-Juncosa. "Platelet Rich Plasma: New Insights for Cutaneous Wound Healing Management." *Journal of Functional Biomaterials* 9, no. 1 (January 18, 2018): 10. https://doi.org/10.3390/jfb9010010.
García-Sánchez, José María, Vicente Mirabet Lis, Alejandro Ruiz-Valls, Aranzazu Pérez-Plaza, Pilar Sepúlveda Sanchis, and María Dolores Pérez-del-Caz. "Platelet Rich Plasma and Plasma Rich in Growth Factors for Split-Thickness Skin Graft Donor Site Treatment in the Burn Patient Setting: A Randomized Clinical Trial." *Burns*, October 22, 2021. https://doi.org/10.1016/j.burns.2021.10.001.
Kelm, Ryan C., and Omer Ibrahim. "Utility of Platelet-Rich Plasma in Aesthetics." *Clinics in Dermatology*, Commentary: Reflections on Debates in Aesthetic Dermatology: Part I, 40, no. 1 (January 1, 2022): 19–28. https://doi.org/10.1016/j.clindermatol.2021.08.007.
Pourkarim, Reza, Mohammad Reza Farahpour, and Siamak Asri Rezaei. "Comparison Effects of Platelet-Rich Plasma on Healing of Infected and Non-Infected Excision Wounds by the Modulation of the Expression of Inflammatory Mediators: Experimental Research." *European Journal of Trauma and Emergency Surgery: Official Publication of the European Trauma Society*, February 12, 2022. https://doi.org/10.1007/s00068-022-01907-0.
Saputro, Iswinarno Doso, Sitti Rizaliyana, and Dhitta Aliefia Noverta. "The Effect of Allogenic Freeze-Dried Platelet-Rich Plasma in Increasing the Number of Fibroblasts and Neovascularization in Wound Healing." *Annals of Medicine and Surgery* 73 (January 3, 2022): 103217. https://doi.org/10.1016/j.amsu.2021.103217.
Spanò, Raffaele, Anita Muraglia, Maria R. Todeschi, Marta Nardini, Paolo Strada, Ranieri Cancedda, and Maddalena Mastrogiacomo. "Platelet-Rich Plasma-Based Bioactive Membrane as a New Advanced Wound Care Tool." *Journal of Tissue Engineering and Regenerative Medicine* 12, no. 1 (2018): e82–96. https://doi.org/10.1002/term.2357.

Review of Studies Showing Benefit with Mesh Pain

Prodromidou, Anastasia, Dimitrios Zacharakis, Stavros Athanasiou, Athanasios Protopapas, Lina Michala, Nikolaos Kathopoulis, and Themos Grigoriadis. “The Emerging Role on the Use of Platelet-Rich Plasma Products in the Management of Urogynaecological Disorders.” *Surgical Innovation*, April 28, 2021, 15533506211014848. https://doi.org/10.1177/15533506211014848.

❖

Technique

- Inject directly into tissue surrounding mesh.
- If mesh removed, patch with PRP gel
- Consider injecting along pudendal nerve (as in pudendal nerve block)

Interstitial Cystitis

Rationale

- PRP antibacterial and down regulates autoimmune and can help with chronic inflammation

Selection from Many Papers Showing Benefit From PRP for Chronic Infection

Aggour, Reham L., and Lina Gamil. “Antimicrobial Effects of PlatelAggour, Reham L., and Lina Gamil. “Antimicrobial Effects of Platelet-Rich Plasma against Selected Oral and Periodontal Pathogens.” *Polish Journal of Microbiology* 66, no. 1 (April 3, 2017): 31–37. https://doi.org/10.5604/17331331.1235227.

Cieslik-Bielecka, A., D. M. Dohan Ehrenfest, A. Lubkowska, and T. Bielecki. “Microbicidal Properties of Leukocyte- and Platelet-Rich Plasma/Fibrin (L-PRP/L-PRF): New Perspectives.” *Journal of Biological Regulators and Homeostatic Agents* 26, no. 2 Suppl 1 (2012).

Sethi, Dalip, Kimberly E. Martin, Sangeeta Shrotriya, and Bethany L. Brown. “Systematic Literature Review Evaluating Evidence and Mechanisms of Action for Platelet-Rich Plasma as an Antibacterial Agent.” *Journal of Cardiothoracic Surgery* 16, no. 1 (September 28, 2021): 277. https://doi.org/10.1186/s13019-021-01652-2.

Zhang, Wenhai, Yue Guo, Mitchell Kuss, Wen Shi, Amy L. Aldrich, Jason Untrauer, Tammy Kielian, and Bin Duan. “Platelet-Rich Plasma for the Treatment of Tissue Infection: Preparation and Clinical Evaluation.” *Tissue Engineering. Part B, Reviews* 25, no. 3 (June 1, 2019): 225–36. https://doi.org/10.1089/ten.teb.2018.0309.

et-Rich Plasma against Selected Oral and Periodontal Pathogens.” *Polish Journal of Microbiology* 66, no. 1 (April 3, 2017): 31–37. https://doi.org/10.5604/17331331.1235227.

Beitia, Maider, Diego Delgado, Pello Sánchez, Ana Vallejo de la Cueva, José Ramón Cugat, and Mikel Sánchez. “Platelet Lysate Nebulization Protocol for the Treatment of COVID-19 and Its Sequels: Proof of Concept and Scientific Rationale.” *International Journal of Molecular Sciences* 22, no. 4 (February 12, 2021): 1856. https://doi.org/10.3390/ijms22041856.

❖

Papers Demonstrating IC Relief with PRP

Chen, Yung-Hsiang, Kee-Ming Man, Wen-Chi Chen, Po-Len Liu, Kao-Sung Tsai, Ming-Yen Tsai, Yu-Tzu Wu, and Huey-Yi Chen. “Platelet-Rich Plasma Ameliorates Cyclophosphamide-Induced Acute Interstitial Cystitis/Painful Bladder Syndrome in a Rat Model.” *Diagnostics (Basel, Switzerland)* 10, no. 6 (June 8, 2020): E381. https://doi.org/10.3390/diagnostics10060381.

Dönmez, M. İrfan, Kubilay İnci, Naciye Dilara Zeybek, H. Serkan Doğan, and Ali Ergen. “The Early Histological Effects of Intravesical Instillation of Platelet-Rich Plasma in Cystitis Models.” *International Neurourology Journal* 20, no. 3 (September 2016): 188–96. https://doi.org/10.5213/inj.1632548.274.

Huang, Yun-Ching, and Yao-Chi Chuang. “Reply to the Commentary on ‘New Frontiers or the Treatment of Interstitial Cystitis/Bladder Pain Syndrome-Focused on Stem Cells, Platelet-Rich Plasma, and Low-Energy Shock Wave.’” *International Neurourology Journal* 24, no. 4 (December 2020): 389–90. https://doi.org/10.5213/inj.2040414.207.

Jhang, Jia-Fong, Yuan-Hong Jiang, Yung-Hsiang Hsu, Han-Chen Ho, Lori A. Birder, Teng-Yi Lin, and Hann-Chorng Kuo. “Improved Urothelial Cell Proliferation, Cytoskeleton and Barrier Function Protein Expression in the Patients With Interstitial Cystitis/Bladder Pain Syndrome After Intravesical Platelet-Rich Plasma Injection.” *International Neurourology Journal* 26, no. Suppl 1 (February 2022): S57-67. https://doi.org/10.5213/inj.2142100.050.

Jhang, Jia-Fong, Teng-Yi Lin, and Hann-Chorng Kuo. “Intravesical Injections of Platelet-Rich Plasma Is Effective and Safe in Treatment of Interstitial Cystitis Refractory to Conventional Treatment-A Prospective Clinical Trial.” *Neurourology and Urodynamics*, no. October (2018). https://doi.org/10.1002/nau.23898.

———. “Intravesical Injections of Platelet-Rich Plasma Is Effective and Safe in Treatment of Interstitial Cystitis Refractory to Conventional Treatment-A Prospective Clinical Trial.” *Neurourology and Urodynamics* 38, no. 2 (February 2019): 703–9. https://doi.org/10.1002/nau.23898.

Jhang, Jia-Fong, Shu-Yu Wu, Teng-Yi Lin, and Hann-Chorng Kuo. “Repeated Intravesical Injections of Platelet-Rich Plasma Are Effective in the Treatment of Interstitial Cystitis: A Case Control Pilot Study.” *Lower Urinary Tract Symptoms* 11, no. 2 (April 2019): O42–47. https://doi.org/10.1111/luts.12212.

Jiang, Yuan-Hong, Yuh-Chen Kuo, Jia-Fong Jhang, Cheng-Ling Lee, Yung-Hsiang Hsu, Han-Chen Ho, and Hann-Chorng Kuo. “Repeated Intravesical Injections of Platelet-Rich Plasma Improve Symptoms and Alter Urinary Functional Proteins in Patients with Refractory Interstitial Cystitis.” *Scientific Reports* 10, no. 1 (September 16, 2020): 15218. https://doi.org/10.1038/s41598-020-72292-0.

Ke, Qian-Sheng, Jia-Fong Jhang, Teng-Yi Lin, Han-Chen Ho, Yuan-Hong Jiang, Yuan-Hsiang Hsu, and Hann-Chorng Kuo. “Therapeutic Potential of Intravesical Injections of Platelet-Rich Plasma in the Treatment of Lower Urinary Tract Disorders Due to Regenerative Deficiency.” *Ci Ji Yi Xue Za Zhi = Tzu-Chi Medical Journal* 31, no. 3 (September 2019): 135–43. https://doi.org/10.4103/tcmj.tcmj_92_19.

Mirzaei, Mahboubeh, Azar Daneshpajooh, Alireza Farsinezhad, Zeinab Jafarian, Mohammad Reza Ebadzadeh, Narjes Saberi, and Mohammad Teimorian. “The Therapeutic Effect of Intravesical Instillation of Platelet Rich Plasma on Recurrent Bacterial Cystitis in Women: A Randomized Clinical Trial.” *Urology Journal* 16, no. 6 (December 24, 2019): 609–13. https://doi.org/10.22037/uj.v0i0.5239.

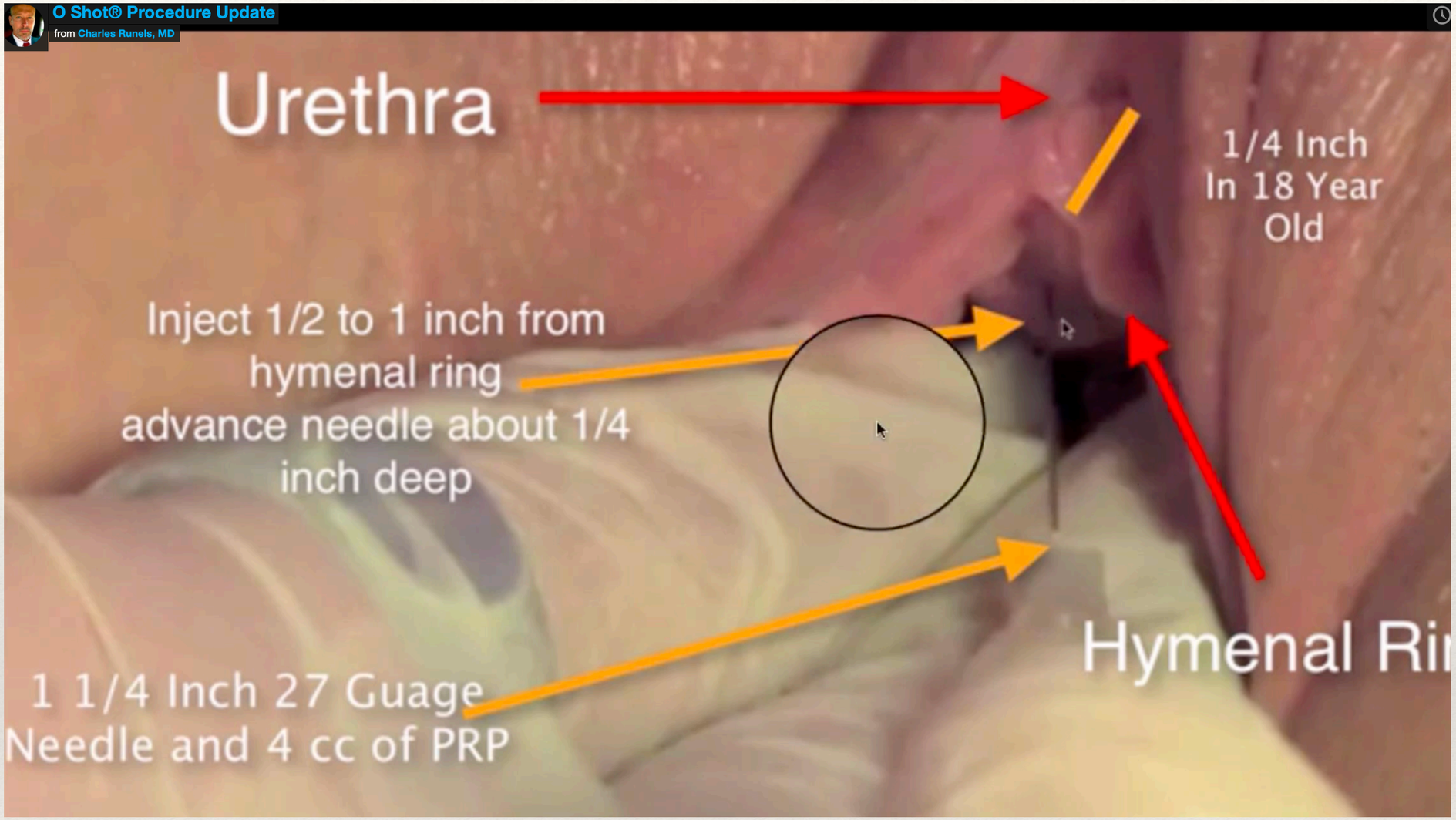
Ozyuvali, E., M. E. Yildirim, T. Yaman, B. Kosem, O. Atli, and E. Cimentepe. “Protective Effect of Intravesical Platelet-Rich Plasma on Cyclophosphamide-Induced Hemorrhagic Cystitis.” *Clinical and Investigative Medicine. Medecine Clinique Et Experimentale* 39, no. 6 (December 1, 2016): 27514.

Riccetto, Cássio L. Z. “Editorial Comment: Intravesical Injections of Platelet-Rich Plasma Is Effective and Safe in Treatment of Interstitial Cystitis Refractory to Conventional Treatment-A Prospective Clinical Trial.” *International Braz J Urol: Official Journal of the Brazilian Society of Urology* 47, no. 2 (April 2021): 456–57. https://doi.org/10.1590/S1677-5538.IBJU.2021.02.04.

Trama, Francesco, Ester Illiano, Alessandro Marchesi, Stefano Brancorsini, Felice Crocetto, Savio Domenico Pandolfo, Alessandro Zucchi, and Elisabetta Costantini. “Use of Intravesical Injections of Platelet-Rich Plasma for the Treatment of Bladder Pain Syndrome: A Comprehensive Literature Review.” *Antibiotics (Basel, Switzerland)* 10, no. 10 (October 1, 2021): 1194. https://doi.org/10.3390/antibiotics10101194.

Techinques

- Intravesicular injection
- O-Shot®



Runels, Charles, Hugh Melnick, Ernest Debourbon, and Lisbeth Roy. "A Pilot Study of the Effect of Localized Injections of Autologous Platelet Rich Plasma (PRP) for the Treatment of Female Sexual Dysfunction." *Women's Health Care* 3, no. 4 (2014): 3–6. https://doi.org/10.4172/2167-0420.100016.

For Post Episiotomy Pain

- Simply infiltrate the tissue with PRP
- Repeat in 6 weeks x 3 treatments
- Refer to previously listed papers regarding chronic wound care and tissue revival.

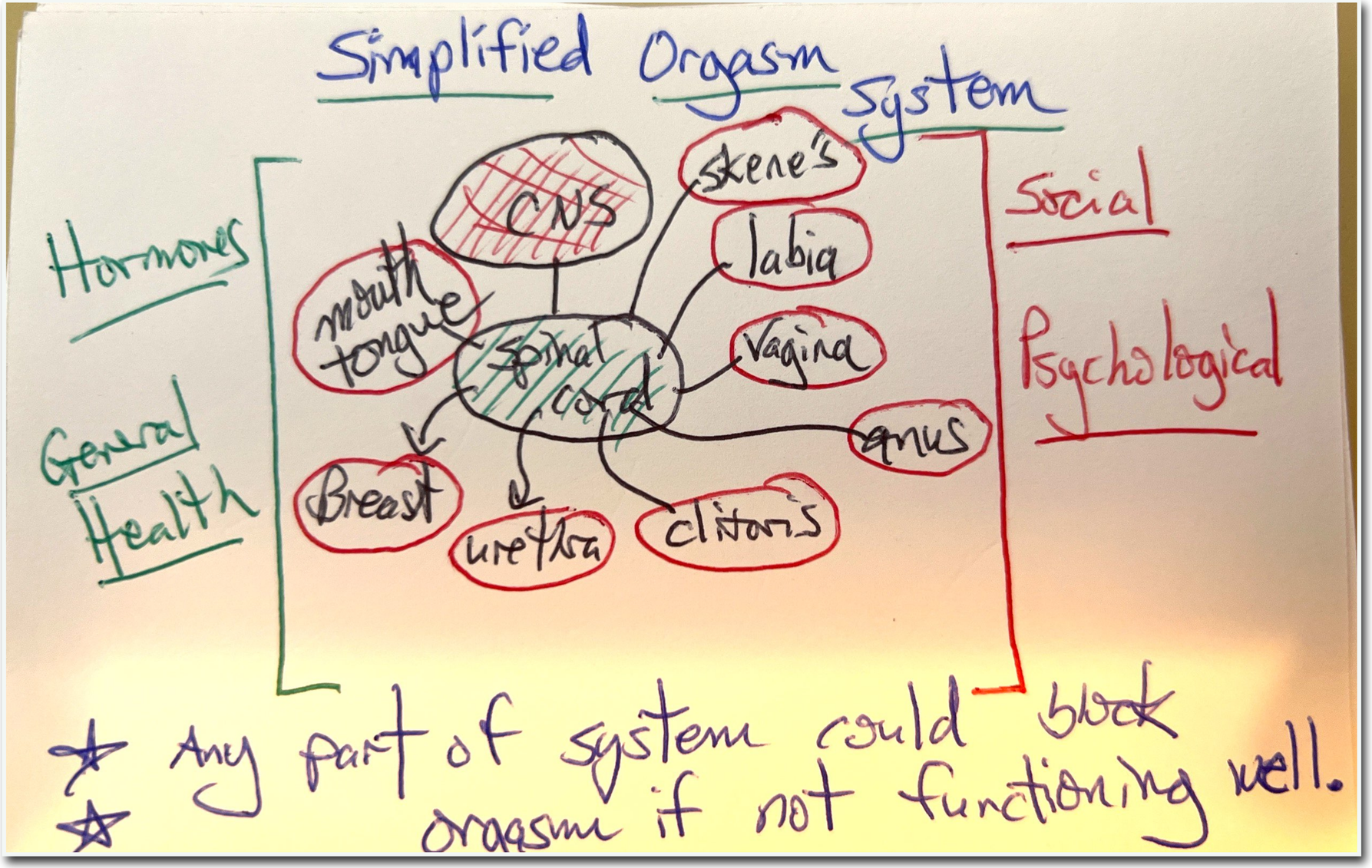
Vaginismus

- Use the usual combinations of Botox with vaginal dilators and sex therapy.
- Add PRP to help block the negative feedback look of chronic muscle changes and resulting pain and spasm.

Pelvic Floor Tenderness

- Simply use to inject trigger points with 1-2 cc of PRP (instead of triamcinolone)
- See previous listed papers demonstrating muscle revival and decreased inflammation and muscle fibrosis by the injection of PRP

Anorgasmia



Any dysfunctional part of the system could block orgasm. So, injection of PRP to the genital is not a cure all.

Causes of Anorgasmia that May be Helped

- Midurethral sling
- Bicycle injury
- Child birth
- Decreased estrogen and not able to tolerate hormone replacement

Hersant B, et al, ***Efficacy of injecting platelet concentrate combined with hyaluronic acid for the treatment of vulvovaginal atrophy in postmenopausal women with a history of breast cancer: a phase 2 pilot study. Menopause 2018, Vol 25, No. 10, pp. 1124-1130***

More selected papers supporting PRP for Orgasm

Samaie Nouroozi, Atefeh, Ashraf Alyasin, Ashraf Malek Mohammadi, Nili Mehrdad, Seyed Asadollah Mossavi, Mohammad Vaezi, atoosa Gharib, Ardeshir Ghavamzadeh, and Saeed Mohammadi. "Autologous Platelet-Released Growth Factor and Sexual Dysfunction Amendment: A Pilot Clinical Trial of Successful Improvement Sexual Dysfunction after Pelvic Irradiation." *Asian Pacific Journal of Cancer Prevention* 20, no. 3 (March 1, 2019): 817–23. https://doi.org/10.31557/APJCP.2019.20.3.817.

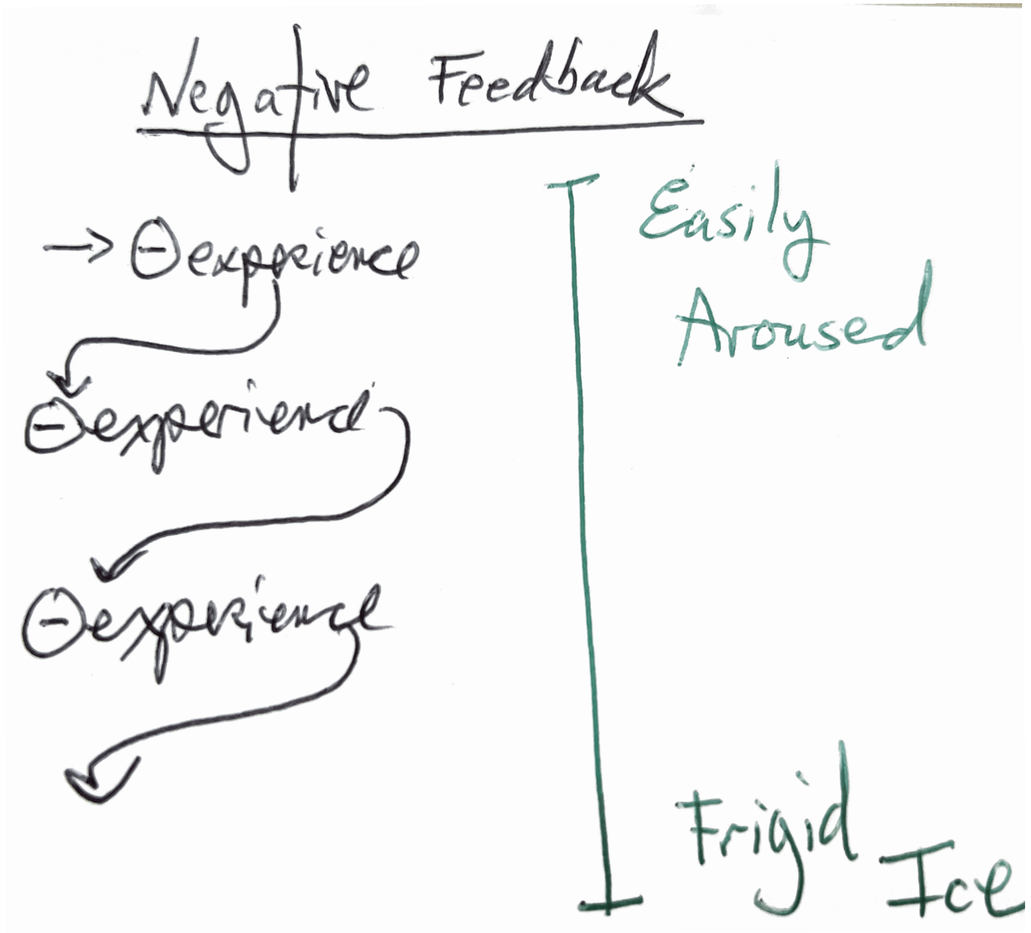
Zheng, Zhifang, Junfeiyang Yin, Biao Cheng, and Wenhua Huang. "Materials Selection for the Injection into Vaginal Wall for Treatment of Vaginal Atrophy." *Aesthetic Plastic Surgery* 45, no. 3 (June 1, 2021): 1231–41. https://doi.org/10.1007/s00266-020-02054-w.

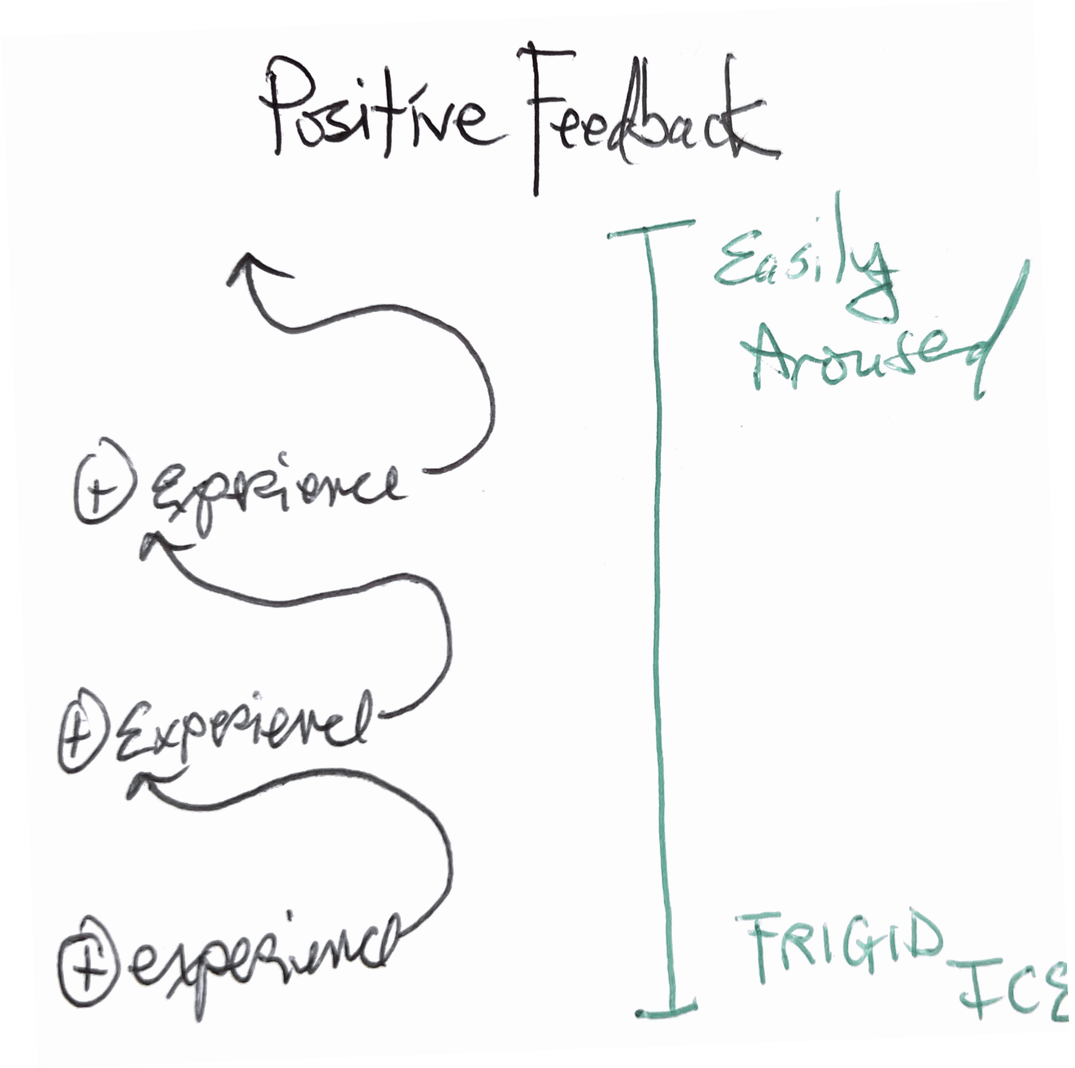
Runels, Charles. "A Pilot Study of the Effect of Localized Injections of Autologous Platelet Rich Plasma (PRP) for the Treatment of Female Sexual Dysfunction." *Journal of Women's Health Care* 03, no. 04 (2014). https://doi.org/10.4172/2167-0420.1000169.

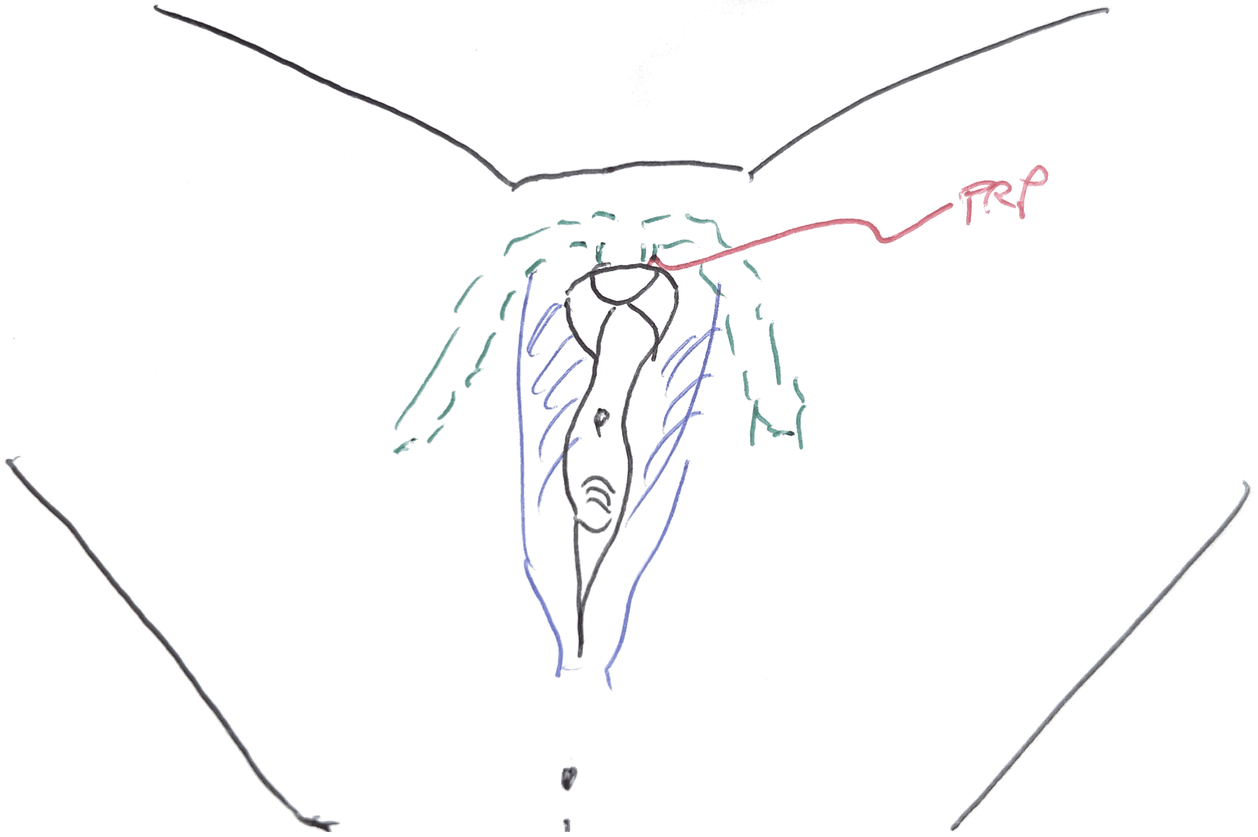
❖

Decreased Arousal

- Negative feedback
- Positive feedback


Negative Feedback
→ ⊖experience
⊖experience
⊖experience
Easily Aroused
Frigid
Ice


Positive Feedback
Easily Aroused
+ Experience
+ Experienced
+ experience
FRIGID ICE


PRP

For video, see CellularMedicineAssociation.org/iscg-free

Has the science yet reached the place where PRP use has become the standard of care and ignoring the tool a disservice to patients?

FDA Policies Regarding Platelet-Rich Plasma

The Main FDA Statement…

"This guidance also does not apply to products that fall outside the definition of HCT/P in 21 CFR 1271.3(d). For example, platelet rich plasma (PRP, blood taken from an individual and given back to the same individual as platelet rich plasma) is not an HCT/P under 21 CFR Part 1271 because it is a blood product. Accordingly, FDA does not apply the criteria in 21 CFR 1271.10(a) to PRP, and PRP is outside the scope of this guidance."

"Regulatory Considerations for Human Cells, Tissues, and Cellular and Tissue-Based Products: Minimal Manipulation and Homologous Use; Guidance for Industry and Food and Drug Administration Staff," n.d., 28.

FDA Summary

- The FDA ***does not*** regulate procedures: Food, Drug (and Device) Administration.
- The FDA ***does not*** regulate PRP.
- The FDA ***does*** regulate devices used to prepare PRP.
- The FDA does regulate stem cells, exosomes, amniotic fluid, and mesynchemal cells as a drug—IND or IRB needed.

Disclaimer

- Founder of the Cellular Medicine Association (CMA). For profit organization to help with development and teaching of ways to improve health and sexual function using cell-based strategies (3,729 members in 56 countries).
- Founder of the Institute for Lichen Sclerosus & Vulvar Health: non-profit organization devoted to developing, teaching, and providing care for women suffering with vulvar disease.

CellularMedicineAssociation.org/iscg-free