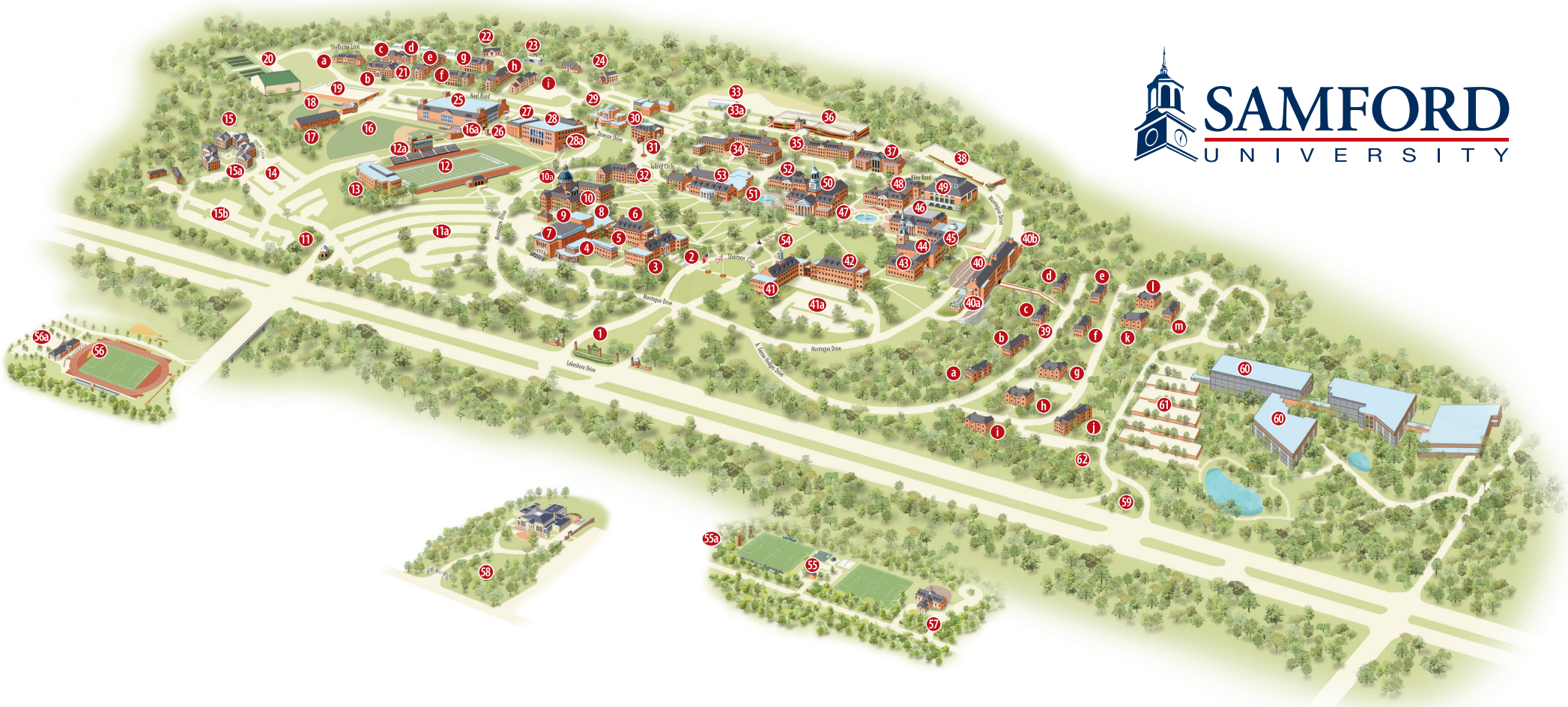
SAMFORD UNIVERSITY



1. Main Gate
2. Sherman Oak
3. Frank Park Samford Hall (Admission, Administration)
4. Jane Hollock Brock Hall
   Jane Hollock Brock Recital Hall
5. Hazel P. Boren Courtyard and Garden
6. John H. Buchanan Hall (Arts)
7. Leslie S. Wright Fine Arts Center
8. Bonnie Bolding Swearingen Hall
   Benjamin F. Harrison Theatre
   Bolding Studio
   Samford Art Gallery
9. Gertha Itasca Earwood Bolding Memorial Garden
10. Divinity Hall (Divinity)
10a. Andrew Gerow Hodges Chapel
11. West Gate Entrance
11a. Lower Leslie S. Wright Fine Arts Center Parking Lot
12. F. Page Seibert Stadium
12a. Leo E. Bashinsky Press Tower
13. Sullivan-Cooney Family Field House
14. South Stadium Parking Lot
15. West Village
15a. Barbara Drummond Thorne Hall
15b. West Village Parking
16. Joe Lee Griffin Baseball Field
16a. Carl E. Miller Jr. Press Box
17. J. T. Haywood Field House
18. Bulldog Softball Field
19. West Parking Deck
20. Samford Tennis Center
    Darwin E. Hardison Tennis Courts
    Pat Murphy Courington Tennis Pavilion
21. West Campus Residence Halls
    a. Alpha Omicron Pi
    b. Mountain View
    c. Sigma Nu
    d. Sigma Chi
    e. Phi Mu
    f. Chi Omega
    g. Alpha Delta Pi
    h. Zeta Tau Alpha
    i. New Greek Housing
22. Pi Kappa Phi House
23. Air Force ROTC Detachment
24. Theta Alpha House
25. Pete Hanna Center (Athletics)
    Thomas E. and Marla H. Corts Arena
    Fitness/Wellness Center
26. Bulldog Spirit Plaza
27. Leo E. Bashinsky Field House
28. F. Page Seibert Hall
28a. University Health Services
29. Dwight M. and Lucille S. Beeson Center for Healing Arts
30. Orlean Bullard Beeson Hall (Education)
31. Victory Flag
32. John D. Pittman Hall
33. Art Lofts
33a. Upper Shop Lot
34. Lena Vail Davis Residence Hall
35. Mamie Mell Smith Residence Hall
36. North Parking Deck
    Facilities Management
37. Cooney Hall (Business)
38. Northeast Parking Deck
39. Beeson Woods Residence Halls
    a. James Hall
    b. Luther Hall
    c. Malcolm Hall
    d. Wesley Hall
    e. Ralph Hall
    f. Orlean Hall
    g. Dwight Hall
    h. Lucille Hall
    i. Treetop Hall
    j. Evergreen Hall
    k. Rosa Hall
    l. Ethel Hall
    m. Marvin Hall
40. William Self Propst Hall
40a. Conservatory
40b. Boyd E. Christenberry Planetarium
41. Robert I. Ingalls Sr. Hall
41a. Ingalls Hall/Russell Hall Parking
42. Thomas D. Russell Hall
43. James Horton Chapman Hall
44. A. Hamilton Reid Chapel
45. Percy Pratt Burns Hall
46. Elinor Messer Brooks and Marion Thomas Brooks Hall (Arts and Sciences)
47. Martha F. and Albert P. Brewer Plaza
48. Memory Leake Robinson Hall (Law)
49. Lucille Stewart Beeson Law Library
50. Harwell G. Davis University Library
51. Ben Brown Plaza
52. Dwight M. Beeson Hall
53. Ralph W. Beeson University Center
    Dining Hall
    Bookstore
    The Hub (Information Center)
    Public Safety
54. Centennial Walk/University Quadrangle
55. Intramural/Recreation Complex
55a. Alpine Tower
56. Track and Soccer Stadium
56a. Track and Soccer Stadium Parking
57. Academy of the Arts
58. President's Home
59. College of Health Sciences Gate Entrance
60. College of Health Sciences (Health Professions, Nursing, Pharmacy, Public Health)
61. College of Health Sciences Parking
62. College of Health Sciences Main Campus Access

Samford University
School of Health Professions

Department of Physical Therapy

PLEDGE OF RESPECT FOR THE SANCTITY OF DONATED HUMAN ANATOMYICAL REMAINS

Policies and Procedures Applicable to Samford University Dissection Laboratory

I, the undersigned student, recognize that the bequest of human remains represents a direct and important contribution to medical teaching and research. Such donations allow health professional faculty and students the opportunity to examine, evaluate and understand the detailed structure of the human body. Further, the caring and thoughtfulness of such bequests provides physicians and research scientists with the opportunity to gain knowledge that might prolong, improve or save someone's life. Without such bequests, medical science and health care would suffer devastating setbacks.

In recognition of the generosity of such bequests, I understand that I must treat donated human anatomical specimens with the utmost respect and gratitude at all times. I acknowledge HIPAA and other privacy regulations continue to protect individual's health information after death. I also acknowledge that NO PHOTOGRAPHY of any part of any human specimen is permitted and that there will be no discussion of any activity that occurs in the laboratory outside the laboratory or on any social media site.

I pledge that NO INDIVIDUALS other than authorized faculty and students registered in my program will have access to any human anatomical specimens to which I have access without written consent from the course director. I also pledge that I have read and understood the Anatomy Laboratory Policy and Procedures for the Study of Human Remains document and viewed the Formaldehyde Training PDF.

_____ _____

Signature Date

Printed Name: _____

Title: _____

Samford University
School of Health Professions
Department of Physical Therapy

ANATOMY LABORATORY POLICY AND PROCEDURES FOR THE STUDY OF HUMAN ANATOMICAL REMAINS

RESPECT FOR HUMAN REMAINS

Education in the gross anatomy laboratory is made possible by the generous individuals who gifted their remains to donation programs. Persons donating their remains for this purpose do not receive any financial compensation for this selfless act. It is imperative that appropriate respect is shown to all cadavers at all times, both during lab and outside lab. No discussion of any activity occurring in lab should occur in any public place. Consonant with this respect, **NO PHOTOGRAPHY** of any part of the remains is permitted for any reason and **NOTHING regarding laboratory activities will be placed on SOCIAL MEDIA**. Under no circumstances may any art of a human cadaver be removed from the laboratory.

PLEDGE OF RESPECT

All participants will read and sign a Pledge of Respect document which states that they have understood the rules of the laboratory and agree to abide by them and have reviewed the Formaldehyde PDF. Any infringement of these policies may result in a participant being asked to leave the laboratory. Signed documents must be submitted to the Nick Washmuth.

LABORATORY ATTIRE

It is appropriate to wear scrubs and/or a lab coat in the anatomy laboratory. The laboratory has a characteristic odor produced by the chemical used in the preservation of the remains. Fluids from the remains may also splash and stain clothing so it is recommended that a set of clothes be designated for laboratory use. Closed-toed shoes must also be worn in case an instrument should fall and strike someone's foot. Long hair should be tied back. Contact lenses may be worn at the student's discretion. Occasionally the chemicals used to preserve the remains may irritate those wearing contact lenses. It is recommended that you take spectacles to the laboratory until you determine whether the chemicals do cause any irritation.

SAFETY IN THE LABORATORY

Dissection involves the use of scalpel blades and other fine instruments – great care must be taken when using these instruments. Only one student should dissect in a small area at any given time to avoid injuring another team member. **NEVER LEAVE A SCALPEL WITH A BLADE ATTACHED IN THE CADAVER BAG.**

It is your responsibility to wear gloves when you dissect. Only wear one pair of gloves at any time – double gloving does not provide any additional protection and reduces the sensitivity of your grip on your instruments, compromising safety. Occasionally, larger instruments or

electrical tools may be used in lab. Eye protection is available in lab and should be worn when utilizing these items. It is everyone's responsibility to keep the work station as clean as possible. Should any material or liquid fall on the floor, clean it immediately to prevent a classmate from slipping and injuring themselves.

You may not eat or drink in the laboratory. **CELL PHONES ARE NOT PERMITTED IN THE LAB**. If you have an emergency, please call the Department of Public Safety at Samford University at 205 726 2020 and their staff will advise you. If you require to call 911, the building location is 815 Montague Drive.

There is a first aid kit in the laboratory for minor injuries and an injury log. All accidents must be reported. There is an eyewash station in the lab. Should you cut yourself:
1. Bleed cut under running water
2. Clean cut with antiseptic soap
3. Apply antibiotic cream to cut
4. Apply band-aid or other dressing over cut
5. Complete injury log

BIOMEDICAL WASTE

It is crucial that waste generated in the anatomy laboratory be disposed of in the proper manner. Red square biohazard boxes are placed at the end of each dissection station. Only human material should be disposed of in these boxes.

A sharps container is placed by the sink in the laboratory. Only scalpel blades should be place in these containers.

Foil scalpel blade wrappers, paper towels and discarded gloves should be placed in the garbage bin.

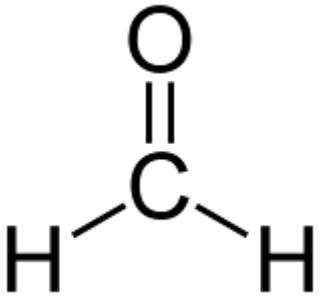
Excess fluid from the cadaver may be vacuumed and will be decanted into a container to be disposed of as biohazard waste.

Samford University Anatomy Laboratory

Formaldehyde Safety Presentation

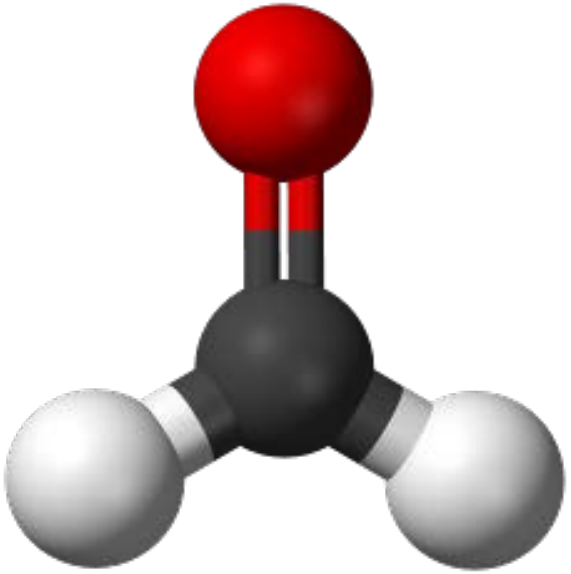
Formaldehyde Safety

Purpose: All persons that may be exposed to formaldehyde, including medical students working in a gross anatomy laboratory, are required by the Occupational Safety and Health Administration (OSHA) to have training in the precautions and hazards of formaldehyde use (http://osha.gov/SLTC/formaldehyde/index.html).



Formaldehyde

Formaldehyde is a colorless chemical with a strong, irritating odor. For laboratory use, it is typically sold as formalin, a methanol-stabilized solution that contains 37%, 44% or 50% formaldehyde. It is one of the most commonly produced chemicals in the United States. Formaldehyde is used primarily in the production of resins, as an intermediate in the production of industrial chemicals (such as ethylene glycol), as a bactericide or fungicide, and as a component in many consumer products.



Formaldehyde

Small levels of formaldehyde can be found in common consumer products.

Examples include:

- Cosmetics
- Permanent press clothing
- Fabrics, curtains, draperies, rugs
- Foam insulation
- Particleboard, paneling, plywood, fiberboard
- Adhesives
- Paints, varnishes, wallpaper
- Resins, plastics
- Cigarette smoke

Formaldehyde is also used in the funeral service industry, in pharmaceuticals as an antibacterial agent, by the oil industry in the preservation of oil well drilling and production fluids, and is a by-product of many industrial processes.

Formaldehyde Exposure

Exposure to formaldehyde can result in various negative health effects. People who are exposed to small quantities over long periods of time may develop:

- Sensitization to formaldehyde
- Reproductive effects
- Mutagenic effects
- Cancer

The quantity of formaldehyde that may be dangerous to a developing fetus is unknown. Therefore, exposure to formaldehyde at any level should be avoided during the early stages of pregnancy.

Every precaution, including a respirator mask, gloves and protective clothing should be worn throughout the remainder of the pregnancy.

Formaldehyde Exposure

Significant health effects can also result from shorter exposures at very high levels. Ingestion of formaldehyde is a poison and can be a strong skin irritant. Formaldehyde is easily absorbed through the skin and is the tenth most common cause of dermatitis. Exposure to airborne concentrations of formaldehyde can lead to respiratory irritation and can result in permanent respiratory damage. Exposure to high airborne concentrations (over 100 parts per million (ppm)) can result in convulsions, coma or death.

Formaldehyde Exposure

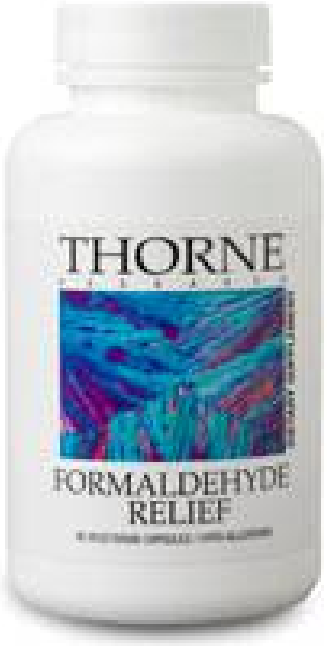
The Occupational Safety and Health Administration's (OSHA) permissible exposure limits (PEL's) are an 8-hour time weighted average (TWA) of 0.75 ppm) and the short term exposure limit (STEL) is 2.0 ppm over a 15 minute period).

An action level (AL) of 0.5 ppm per 8 hour TWA is considered the threshold for activity.

Formaldehyde Exposure

It is important that you are able to recognize signs and symptoms of formaldehyde exposure. Exposure to high levels of formaldehyde can cause:

- Watery eyes
- Burning sensations in the eyes, nose and throat
- Skin rashes
- Nausea
- Coughing
- Chest tightness
- Allergic reactions



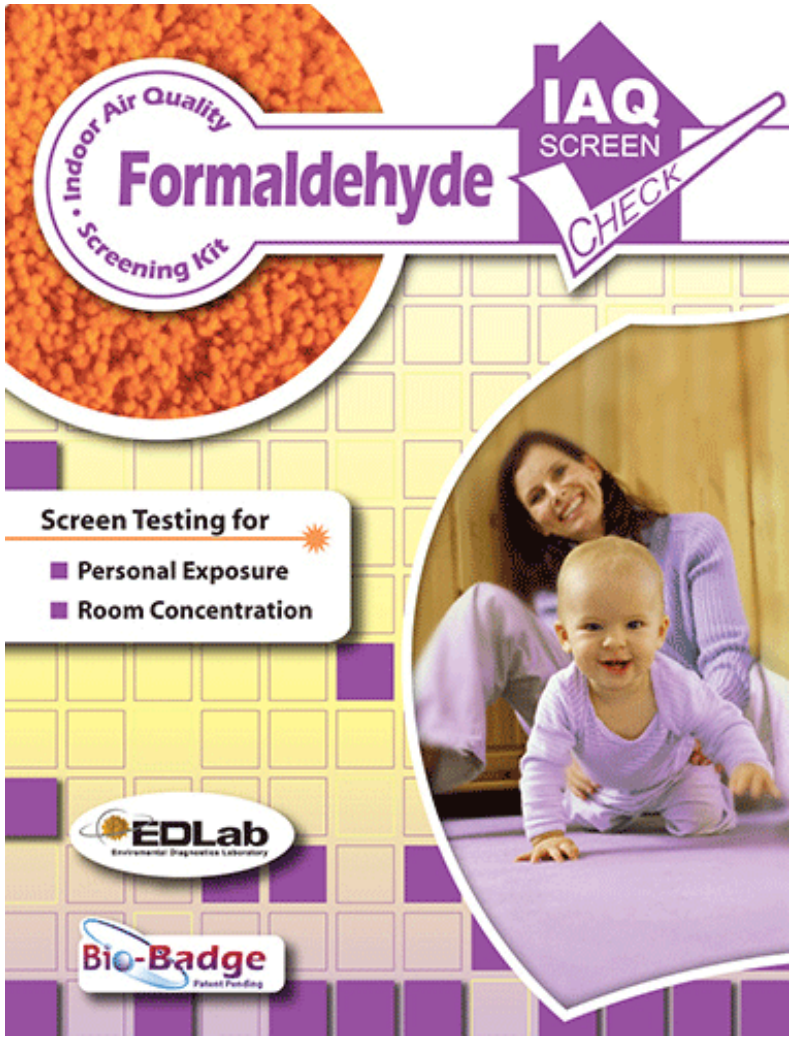
Once a person has become sensitized to formaldehyde, lower exposures can bring on health effects similar to those previously caused by higher exposures.

Formaldehyde Monitoring

Formaldehyde has an odor threshold that ranges from 0.05 ppm to 1.0 ppm. However, relying on the perception of formaldehyde by odor and eye irritation can be problematic as individuals can become less sensitive with time as adaptation to formaldehyde occurs. This can lead to overexposure if reliance on formaldehyde's odor warning properties are used to alert an individual to the potential for exposure. The only way of knowing with certainty an individuals exposure is by personal monitoring.

OSHA requires that any employee exposed to an action level (AL) of 0.5 ppm or a short-term exposure level (STEL) of 2.0 ppm be enrolled in a medical surveillance program.

The formaldehyde levels in the anatomy laboratory at Samford University are tested every six months – reports will also be made available in the laboratory.



Health Effects of Formaldehyde Exposure

Inhalation:

0 – 0.5 ppm: No effects reported

0.5 – 2.0 ppm: Eye and nose sensitivity / irritation

2.0 – 5.0 ppm: Difficulty in breathing, burning sensation in the nose and throat, and coughing

---

25 – 50 ppm: Tissue damage and serious respiratory tract injury. Associated symptoms may include sneezing, wheezing, chest constriction, bronchitis, headache excessive thirst, weakness, palpitations, nausea and vomiting

50 – 100 ppm: Pulmonary edema / inflammation - severe lower airway effects

Health Effects of Formaldehyde Exposure

Inhalation:

Repeated or prolonged exposure may cause headache, rhinitis, nausea, drowsiness, respiratory impairment, kidney injury and pulmonary sensitization. Neuropsychological effects may include sleep disorders, irritability, altered sense of balance, memory deficits, loss of concentration, and mood alterations. Menstrual disorders and secondary sterility have occurred in women.

Long-term exposure to formaldehyde is reported to be associated with an increased risk of cancer of the nose and accessory sinuses and nasopharyngeal and oropharyngeal cancer in humans.

Health Effects of Formaldehyde Exposure

Ingestion:

Acute ingestion of formaldehyde solutions may cause burning of the mouth, throat and stomach, difficulty swallowing, nausea, vomiting and diarrhea, severe abdominal pain, headache, hypertension, vertigo, stupor, convulsions, unconsciousness and coma.
It may also cause damage to the liver, heart, brain, spleen, pancreas, kidney, and central nervous system.
The mean fatal dose in humans is 1 - 2 ounces of a 37% solution.

Chronic, repeated ingestion of small amounts of formaldehyde may cause gastrointestinal irritation, vomiting, and dizziness.

Health Effects of Formaldehyde Exposure

Skin Contact:

Acute exposure to vapors or solutions may cause white discoloration, roughness, anesthesia and first degree burns. In previously exposed individuals, subsequent exposures may result in a sensitization dermatitis characterized by the sudden eruption of blisters on the eyelids, face, neck, scrotum and arms.

Prolonged or repeated exposures may cause second degree burns, numbness, itching rash, fingernail damage, hardening or tanning of the skin and sensitization. The dermatitis that results from chronic exposure to formaldehyde may be either a sudden blistering reaction, or may be delayed several years with eruptions starting on the distal regions, wrists and other parts of the body.

Health Effects of Formaldehyde Exposure

Eye Contact:

Acute airborne concentrations from 0.05 - 3.0 ppm may cause irritation with redness, itching, pain, blurred vision, and mild tearing. Concentrations from 4 - 20 ppm may cause profuse tearing and damage to the eye. Aqueous solution effects range from transient, minor injury and discomfort to severe, permanent corneal opacification and loss of sight.

Chronic exposure effects depend on the concentration and duration of exposure.

Formaldehyde Exposure Prevention

There are several ways to prevent formaldehyde exposure. The most effective method depends on the particular use of the formaldehyde solution.

Ventilation:

When the formaldehyde source is large or has many locations within a room or area (as in anatomy labs), general exhaust ventilation can be used to remove vapors from the room air. In laboratories, the general exhaust removes potentially contaminated air directly from the rooms and exhausts it out of the building.

Formaldehyde Exposure Prevention

Personal Protective Equipment:

Appropriate personal protective equipment (such as formaldehyde impervious gloves, lab coat, apron, face and eye protection) is required for use in areas of formaldehyde exposure.

Respirators are required when engineering or work practice systems cannot prevent airborne formaldehyde concentrations from exceeding OSHA limits. The proper respirator and cartridges must be selected and, if a full-face respirator is not used, then gas-proof goggles must be used in conjunction with a half mask respirator. Respirator cartridges must be replaced every three hours or at the end of the work shift, whichever comes first.

Occupational Safety and Health Administration

OSHA® FactSheet

Formaldehyde

Formaldehyde is a colorless, strong-smelling gas often found in aqueous (water-based) solutions. Commonly used as a preservative in medical laboratories and mortuaries, formaldehyde is also found in many products such as chemicals, particle board, household products, glues, permanent press fabrics, paper product coatings, fiberboard, and plywood. It is also widely used as an industrial fungicide, germicide and disinfectant.

Although the term formaldehyde describes various mixtures of formaldehyde, water, and alcohol, the term "formalin" is used to describe a saturated solution of formaldehyde dissolved in water, typically with another agent, most commonly methanol, added to stabilize the solution. Formalin is typically 37% formaldehyde by weight (40% by volume) and 6-13% methanol by volume in water. The formaldehyde component provides the disinfectant effects of formalin.

What Employers Should Know

The OSHA Formaldehyde standard (29 CFR 1910.1048) and equivalent regulations in states with OSHA-approved state plans protects workers exposed to formaldehyde and apply to all occupational exposures to formaldehyde from formaldehyde gas, its solutions, and materials that release formaldehyde.

- The permissible exposure limit (PEL) for formaldehyde in the workplace is 0.75 parts formaldehyde per million parts of air (0.75 ppm) measured as an 8-hour time-weighted average (TWA).
- The standard includes a second PEL in the form of a short-term exposure limit (STEL) of 2 ppm which is the maximum exposure allowed during a 15-minute period.
- The action level – which is the standard's trigger for increased industrial hygiene monitoring and initiation of worker medical surveillance – is 0.5 ppm when calculated as an 8-hour TWA.

Harmful Effects on Workers

Formaldehyde is a sensitizing agent that can cause an immune system response upon initial exposure. It is also a suspected human carcinogen that is linked to nasal cancer and lung cancer. Acute exposure is highly irritating to the eyes, nose, and throat and can make anyone exposed cough and wheeze. Subsequent exposure may cause severe allergic reactions of the skin, eyes and respiratory tract. Ingestion of formaldehyde can be fatal, and long-term exposure to low levels in the air or on the skin can cause asthma-like respiratory problems and skin irritation such as dermatitis and itching. Concentrations of 100 ppm are immediately dangerous to life and health (IDLH).

Note: The National Institute for Occupational Safety and Health (NIOSH) considers 20 ppm of formaldehyde to be IDLH.

Routes of Exposure

Workers can inhale formaldehyde as a gas or vapor or absorb it through the skin as a liquid. They can be exposed during the treatment of textiles and the production of resins. In addition to healthcare professionals and medical lab technicians, groups at potentially high risk include mortuary workers as well as teachers and students who handle biological specimens preserved with formaldehyde or formalin.

How Employers Can Protect Workers

Airborne concentrations of formaldehyde above 0.1 ppm can cause irritation of the respiratory tract. The severity of irritation intensifies as concentrations increase.

Provisions of the OSHA standard require employers to do the following:

- Identify all workers who may be exposed to formaldehyde at or above the action level or STEL through initial monitoring and determine their exposure.
- Reassign workers who suffer significant adverse effects from formaldehyde exposure to jobs with significantly less or no exposure until their condition improves. Reassignment may continue for up to 6 months until the worker is determined to be able to return to the original job or to be unable to return to work – whichever comes first.
- Implement feasible engineering and work practice controls to reduce and maintain worker exposure to formaldehyde at or below the 8-hour TWA and the STEL. If these controls cannot reduce exposure to or below the PELs, employers must provide workers with respirators.
- Label all mixtures or solutions composed of greater than 0.1 percent formaldehyde and materials capable of releasing formaldehyde into the air at concentrations reaching or exceeding 0.1 ppm. For all materials capable of releasing formaldehyde at levels above 0.5 ppm during normal use, the label must contain the words "potential cancer hazard."
- Train all workers exposed to formaldehyde concentrations of 0.1 ppm or greater at the time of initial job assignment and whenever a new exposure to formaldehyde is introduced into the work area. Repeat training annually.
- Select, provide and maintain appropriate personal protective equipment (PPE). Ensure that workers use PPE such as impervious clothing, gloves, aprons, and chemical splash goggles to prevent skin and eye contact with formaldehyde.
- Provide showers and eyewash stations if splashing is likely.
- Provide medical surveillance for all workers exposed to formaldehyde at concentrations at or above the action level or exceeding the STEL, for those who develop signs and symptoms of overexposure, and for all workers exposed to formaldehyde in emergencies.

Recordkeeping Requirements

Employers are required to do the following regarding worker exposure records:

- Retain exposure records for 30 years.
- Retain medical records for 30 years after employment ends.
- Allow access to medical and exposure records to current and former workers or their designated representatives upon request.

Additional Information

For more information on this, and other health-related issues affecting workers, visit OSHA's web site at www.osha.gov.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; the teletypewriter (TTY) number is (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

OSHA® Occupational Safety and Health Administration
www.osha.gov 1-800-321-6742

DSG 4/2011

http://osha.gov/OshDoc/data_General_Facts/formaldehyde-factsheet.pdf

References

Formaldehyde Awareness Training Booklet, Environmental Health & Safety, Iowa State University, August,1999 (http://www.ehs.iastate.edu/publications/manuals/formaldehyde.pdf)

OSHA Formaldehyde Fact Sheet (http://osha.gov/SLTC/formaldehyde/index.html)

Environmental Protection Agency Formaldehyde Information (http://www.epa.gov/ttn/atw/hlthef/formalde.html)

National Institute for Occupational Safety and Health (http://198.246.98.21/niosh/ipcsneng/neng0695.html)

Samford University
School of Health Professions
Department of Physical Therapy

SESSION 6a

TITLE:
Cadaveric Dissection Lab: Hands On To Help Remember Again What You May Have Forgotten!

DATE OF COURSE:
Saturday, August 17, 2019, 8:30am-12:30pm (Exhibit Hall Break from 10-11am)

COURSE LOCATION:
Samford University, Propst Hall, rooms 238 & 242 (Propst Hall is #40 on the attached map)

COURSE DESCRIPTION:
Clinical anatomy remains a cornerstone in the training of physical therapists. A comprehensive knowledge of anatomy is essential for the skillful practice of neuromusculoskeletal rehabilitation. Through guided cadaveric dissection of the spine, this lab-based course will provide a review of gross anatomy related to the cervical, thoracic, lumbar, and sacroiliac regions. The anatomy revealed during dissection lab will be applied to physical therapy examination, evaluation, and differential diagnosis strategies. Each attendee will take an active role in the cadaveric dissections.

Participants will be expected to arrive wearing appropriate clothing for the cadaver lab, which includes long pants, such as scrubs, and closed-toed shoes. Long hair should be tied back, and contact lenses should be worn at the participant's discretion, with spectacles being recommended.

All other materials, including dissection supplies, will be provided on site.

COURSE OBJECTIVES:
1. Recognize, label, and differentiate between specific anatomic structures in the spine.
2. Explain the function of specific anatomic structures in the spine.
3. Apply anatomy to support evidenced-based physical therapy examination, evaluation, and differential diagnosis strategies.

All lectures in Propst Hall Room 238
All dissections in Propst Hall Room 242

Samford University
School of Health Professions
Department of Physical Therapy

SCHEDULE OF EVENTS

Session 6a: Saturday, August 17th, 2019, 8:30am-12:30pm

Region: Cervical and Thoracic

8:30-8:45 Intro, introductions, agenda, lab safety and respect

8:45-8:55 Present cervicothoracic case

9:00-10:00 Cadaveric dissection
3 regions will be dissected on 3 different cadavers
Participants will be divided into 3 groups, each group dissects a different region
Each region will have a structure list and dissection guide
- Anterior cervical
- Posterior cervical
- Posterior thoracic

Goal is for each group to find all structures on their list, focusing on the bold structures

10:00-11:00 Exhibit Hall Break

11:00-11:30 Complete dissections

11:30-12:30 Groups will review their dissections with the class
Clinical application and open dissection

Samford University
School of Health Professions
Department of Physical Therapy

CERVICOTHORACIC CASE

Subjective:

A 43-year-old female presents to physical therapy with chronic neck pain. She has worked as an administrative assistant for the past 20 years. Her initial onset of neck pain was 2 years ago with a significant increase in pain in the past 6 months. Pain ranges from 2-10/10, with pain worsening as the day progresses. She describes her symptoms as "tightness" and "aching" extending from the superior scapula and shoulder up toward her neck and occipital area. She denies headaches but does report an "aching" pain radiating into her dominant right arm by the end of the day. Her day consists of sitting at a computer 75% of the time and using the computer mouse 50% of that time. She denies any significant medical history or trauma to the cervical spine and her cervical x-rays are unremarkable. She reports a small improvement in her symptoms over the last week since she started taking Ibuprofen and a muscle relaxant prescribed by her family physician. She also reports that she "cracks" her neck multiple times daily, which temporarily reduces her pain.

Objective:

Posture: Patient stands and sits with forward head, protracted scapulae, and thoracic kyphosis.

ROM: Cervical AROM and PROM are WNLs, with pain noted during flexion and bilateral side bending. Thoracic AROM is 75% into all planes, except 25% into extension.

MMT: Supine deep neck flexor test <5 seconds. Shoulder ER 4/5 B, lower trapezius 4-/5 B, middle trapezius 4/5. All other muscles tested 5/5

Palpation: Tenderness noted over suboccipital muscles, sternocleidomastoids, scaleni, 1st ribs, superior angles of scapulae and levator scapulae insertions, thoracic erector spinae and spinous processes, pectoralis minors, and infraspinatus muscle bellies.

Neuro: Dermatomal, myotomal, and reflex testing unremarkable.

Special Tests: Cervical compression negative, Spurling's negative, cervical distraction "feels good". Upper limb tension testing negative. Adaptive shortening of pectoralis minors. Poor scapulohumeral coordination observed during shoulder elevation. Patient tends to initiate cervical movements with cervical protraction. TOS testing negative.

Specific Joint Mobility Testing: Hypermobile facet mobility throughout middle and lower cervical spine. OA joint hypomobile into posterior glide. 1st ribs hypomobile. Upper and middle thoracic and rib PAs hypomobile.

Assessment:

This patient's prolonged low-level static exertions of her cervical and shoulder girdle musculature, combined with her thoracic hypomobility, which can be associated with her job duties, have led to postural neck pain[1]. This pain and her poor posture have likely led to her poor coordination and movement patterns[2-5,9]. Her radiating pain into her R is does not appear radicular in nature[7], but likely a myofascial referred pain[8].

Plan:

The physical therapy management of this patient is multifaceted, and will include soft tissue and joint mobilization, joint manipulation, therapeutic exercise, postural correction strategies, and ergonomic interventions. Manual therapy will be used to modulate pain[11,12]. Initially, the prescription of therapeutic exercise will focus on re-educating the deep cervical flexors and postural muscles[10]; later, general strengthening will be introduced. To foster success of the treatment plan and to prevent reoccurrences, we will educate the patient on proper ergonomic workstation setup[6,13] and implementing rest periods and preventative exercises[6].

1. Hoyle JA, Marras WS, Sheedy JE, Hart DE. Effects of postural and visual stressors on myofascial trigger point development and motor unit rotation during computer work. *J Electromyogr Kinesiol.* 2011;21:41-48.
2. Szeto GP, Straker LM, O'Sullivan PB. During computing tasks symptomatic female office workers demonstrate a trend towards higher cervical postural muscle load than asymptomatic office workers: an experimental study. *Aust J Physiother.*2009;55:257-262.
3. Falla D, Bilenkij G, Jull G. Patients with chronic neck pain demonstrate altered patterns of muscle activation during performance of a functional upper limb task. *Spine.* 2004;29:1436-1440.
4. Edmondston SJ, Chan HY, Ngai GC, et al. Postural neck pain: an investigation of habitual sitting posture, perception of "good" posture and cervicothoracic kinaesthesia. *Man Ther.* 2007;12:363-371.
5. Caneiro JP, O'Sullivan P, Burnett A, et al. The influence of different sitting postures on head/neck posture and muscle activity. *Man Ther.* 2010;15:54-60.
6. Bernaards CM, Ariens GA, Hildebrandt VH. The cost-effectiveness of a lifestyle physical activity intervention in addition to a work style intervention on the recovery from neck and upper limb symptoms in computer workers. *BMC Musculoskelet Disord.* 2006;7:80.
7. Wainner RS, Fritz JM, Irrgang JJ, Boninger ML, Delitto A, Allison S. Reliability and diagnostic accuracy of the clinical examination and patient self-report measures for cervical radiculopathy. *Spine.* 2003;28:52-62.
8. Travell J, Simons D, Simons L. Myofascial Pain and Dysfunction: The Trigger Point Manual. 2nd ed. Lippincott, Williams & Wilkins; 1999
9. Sahrmann S. Diagnosis and Treatment of Movement Impairment Syndromes. St. Louis, MO: Mosby; 2002.
10. Wegner S, Jull G, O'Leary S, Johnston V. The effect of a scapular postural correction strategy on trapezius activity in patients with neck pain. *Man Ther.* 2010;15:562-566.
11. Miller J, Gross A, D'Sylva J, et al. Manual therapy and exercise for neck pain: a systematic review. *Man Ther.*2010;15:334-354.
12. Gross A, Miller J, D'Sylva J, et al. COG. Manipulation or mobilisation for neck pain: a Cochrane Review. *Man Ther.* 2010;15:315-333.
13. Fabrizio P. Ergonomic intervention in the treatment of a patient with upper extremity and neck pain. *Phys Ther.* 2009;89:351-360.

Samford University
School of Health Professions
Department of Physical Therapy

ANTERIOR CERVICAL: Dissection Instructions

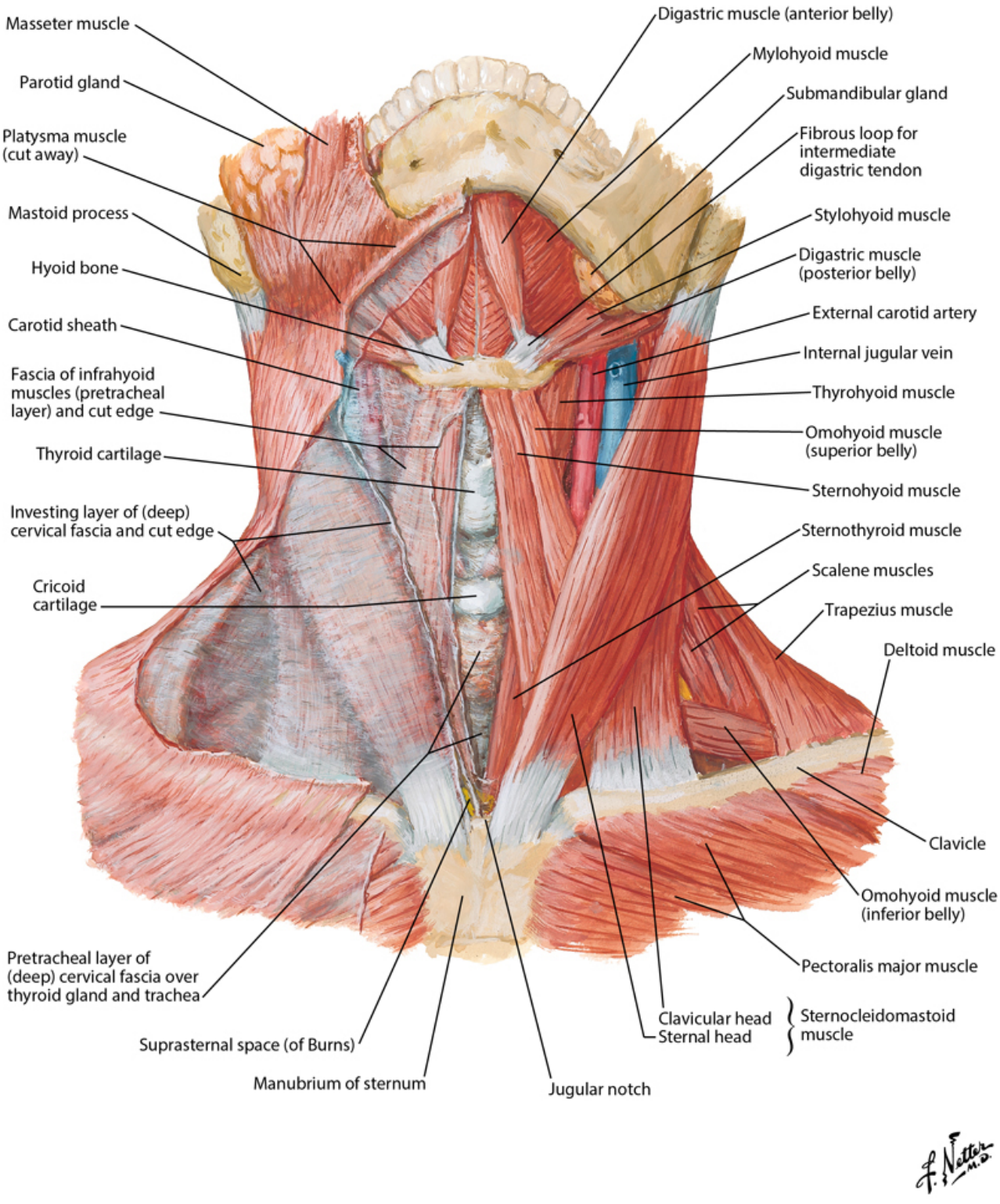
Structure List:

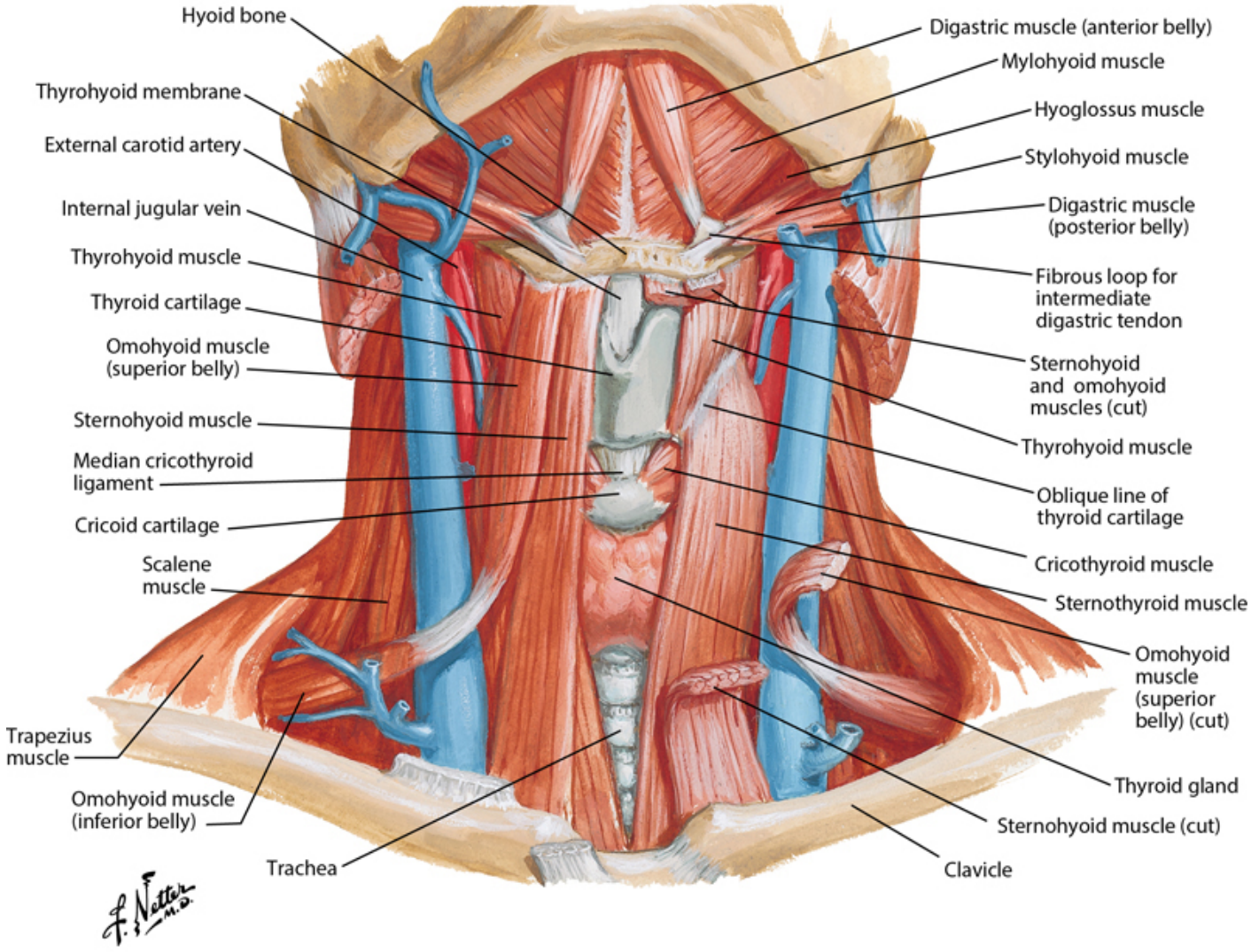
Muscles	Nerves	Other Structures
platysma **sternocleidomastoid** sternohyoid superior & inferior bellies of omohyoid sternothyroid thyrohyoid **anterior, middle, & posterior scalenes** **longus colli & longus capitus muscles**	**brachial plexus**	hyoid bone subclavian artery

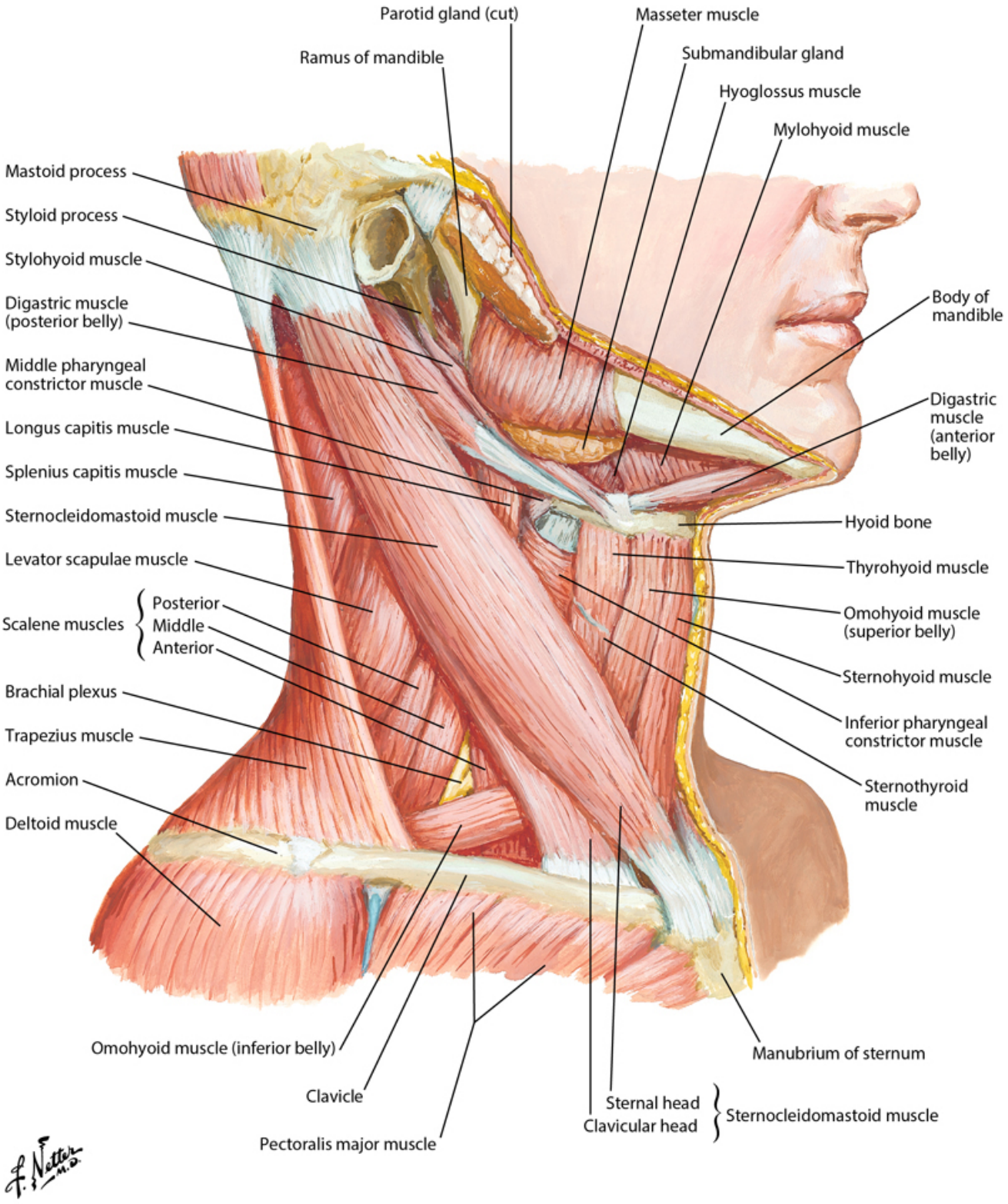
The neck is divided into an anterior triangle and a posterior triangle. The posterior triangle of the neck is bounded anteriorly by the posterior border of the sternocleidomastoid muscle, posteriorly by the superior border of the trapezius muscle, and inferiorly by the middle one-third of the clavicle. The anterior triangle of the neck is bounded medially by the median plane of the neck, laterally by the anterior borer of the SCM, and superiorly by the inferior border of the mandible.

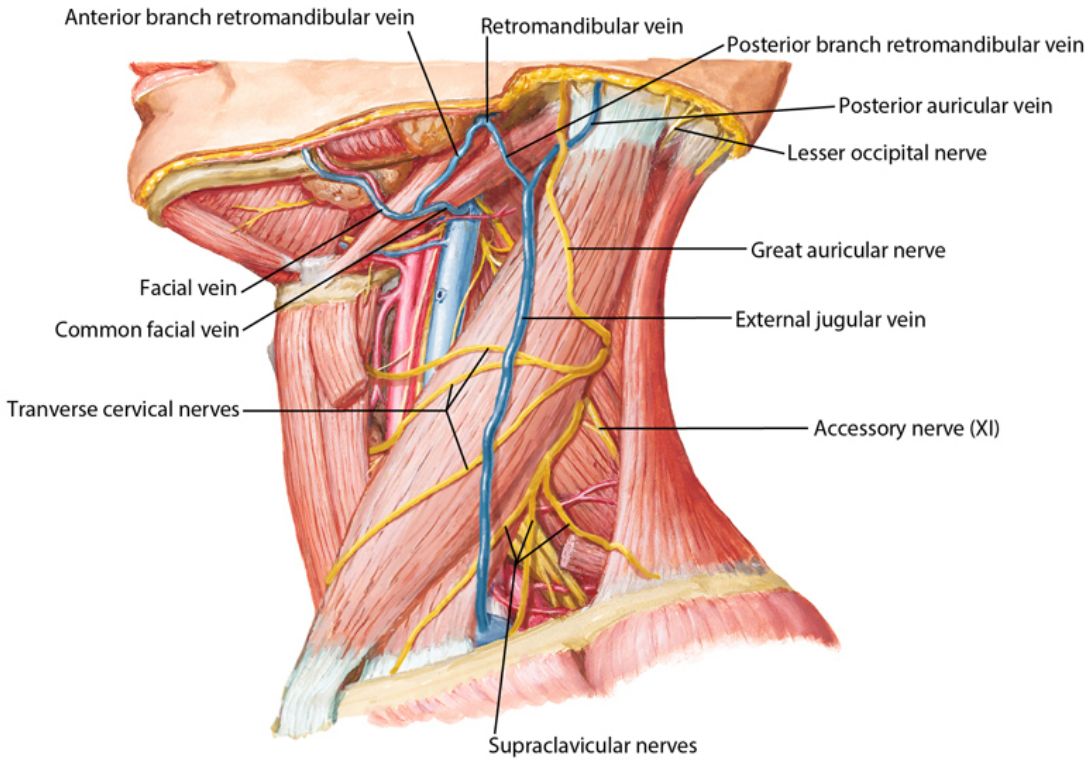
1. Skin removal: Make skin incision along the midline of the neck and reflect skin laterally or detach skin and place in tissue container.
2. Identify the **platysma muscle** in the superficial fascia of the neck. The platysma is very thin and covers the lower part of the posterior triangle.
3. Reflect the platysma superiorly as far as the mandible.
4. Identify and clean the **sternocleidomastoid muscle**. Appreciate the 2 heads of the SCM.
5. Identify the **hyoid bone**.
6. Identify and clean the infrahyoid muscles:
    a. **Sternohyoid muscle**, near the midline of the neck. Reflect the sternohyoid superiorly.
    b. **Superior belly of the omohyoid muscle**, lateral to the sternohyoid. Follow the superior belly to the **inferior belly of the omohyoid muscle**.
    c. Deep to the sternohyoid find the **sternothyroid muscle** inferiorly and the **thyrohyoid muscle** superiorly.
7. Cut and reflect the SCM and upper trapezius superiorly, to expose the **anterior, middle, and posterior scalene muscles**. You may have to cut and reflect the jugular and carotid vessel. Appreciate the **brachial plexus** and **subclavian artery** traveling between the anterior and middle scaleni (interscalene triangle).
8. Cut and reflect/detach all anterior neck structures down to the prevertebral fascia on the anterior surface of the vertebral column. This fascia covers the **longus colli and longus capitus muscles**, as well as the scaleni.
9. Clinical application: Consider taking bone saw or chisel to the vertebrae and intervertebral discs.

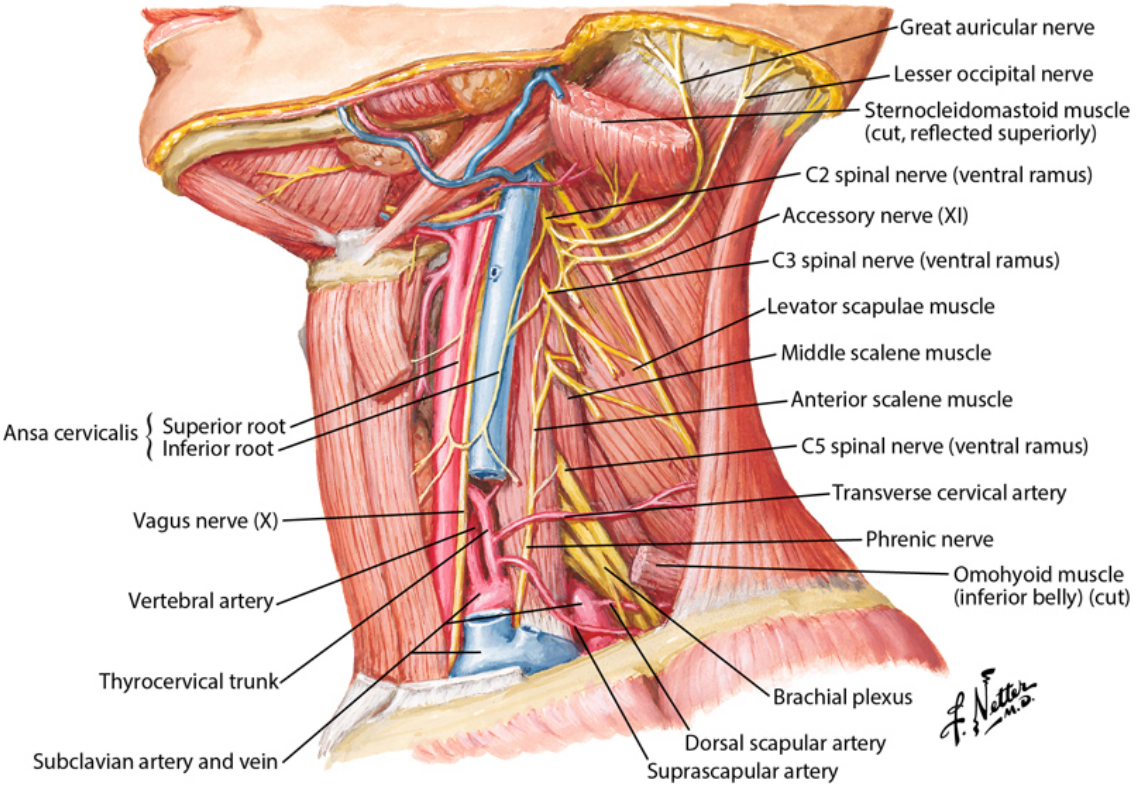
Samford University
School of Health Professions
Department of Physical Therapy

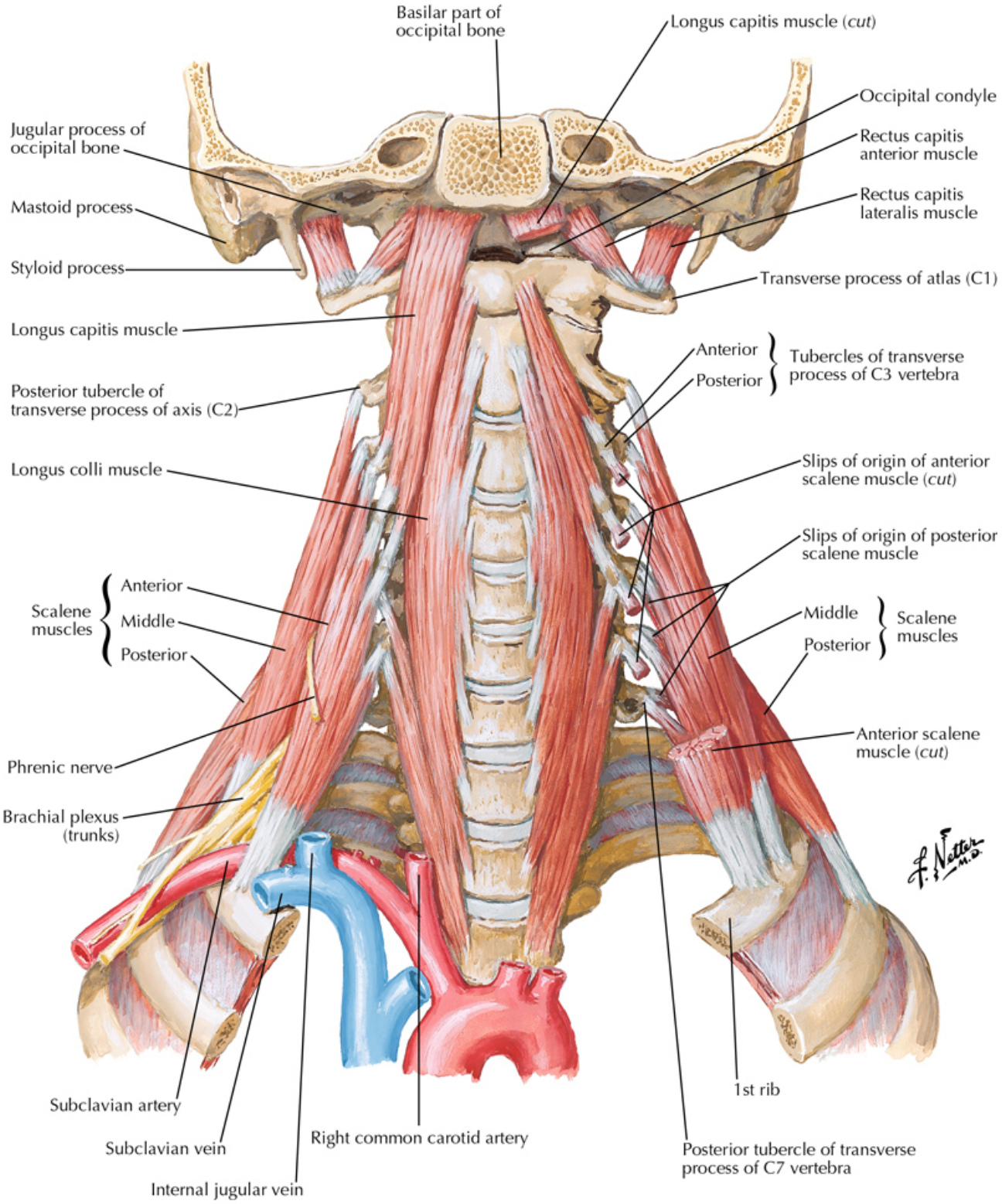


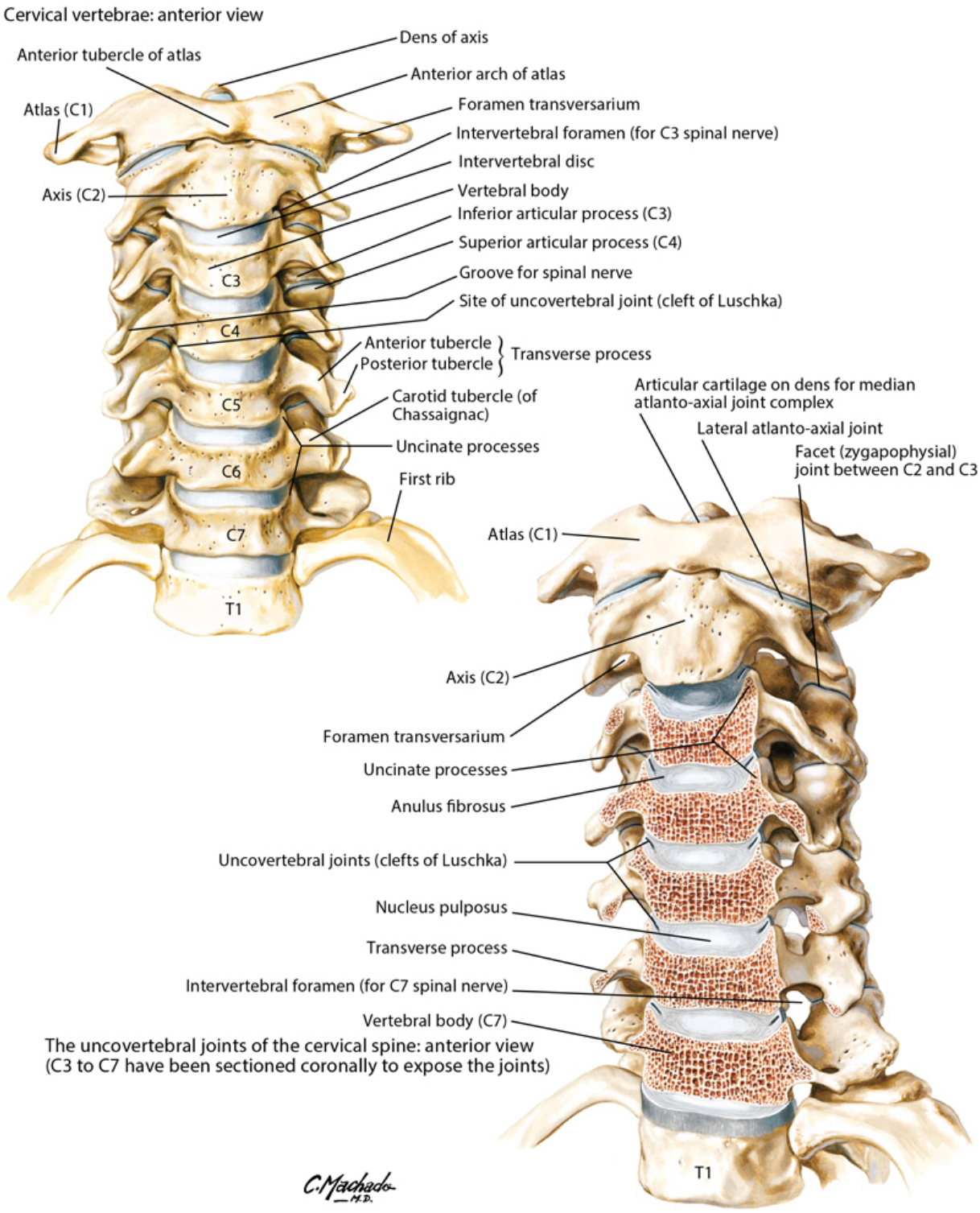




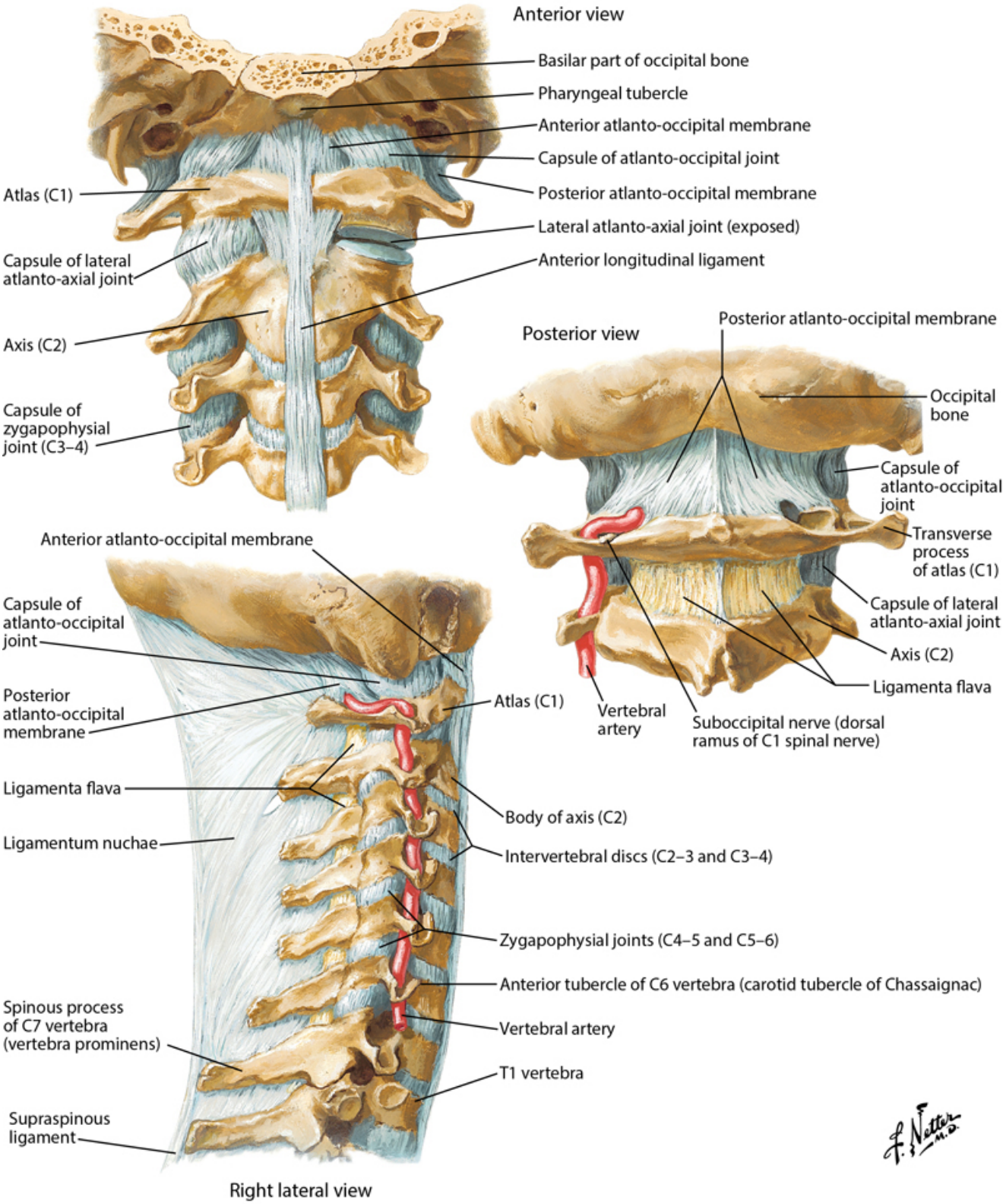








The uncovertebral joints of the cervical spine: anterior view
(C3 to C7 have been sectioned coronally to expose the joints)



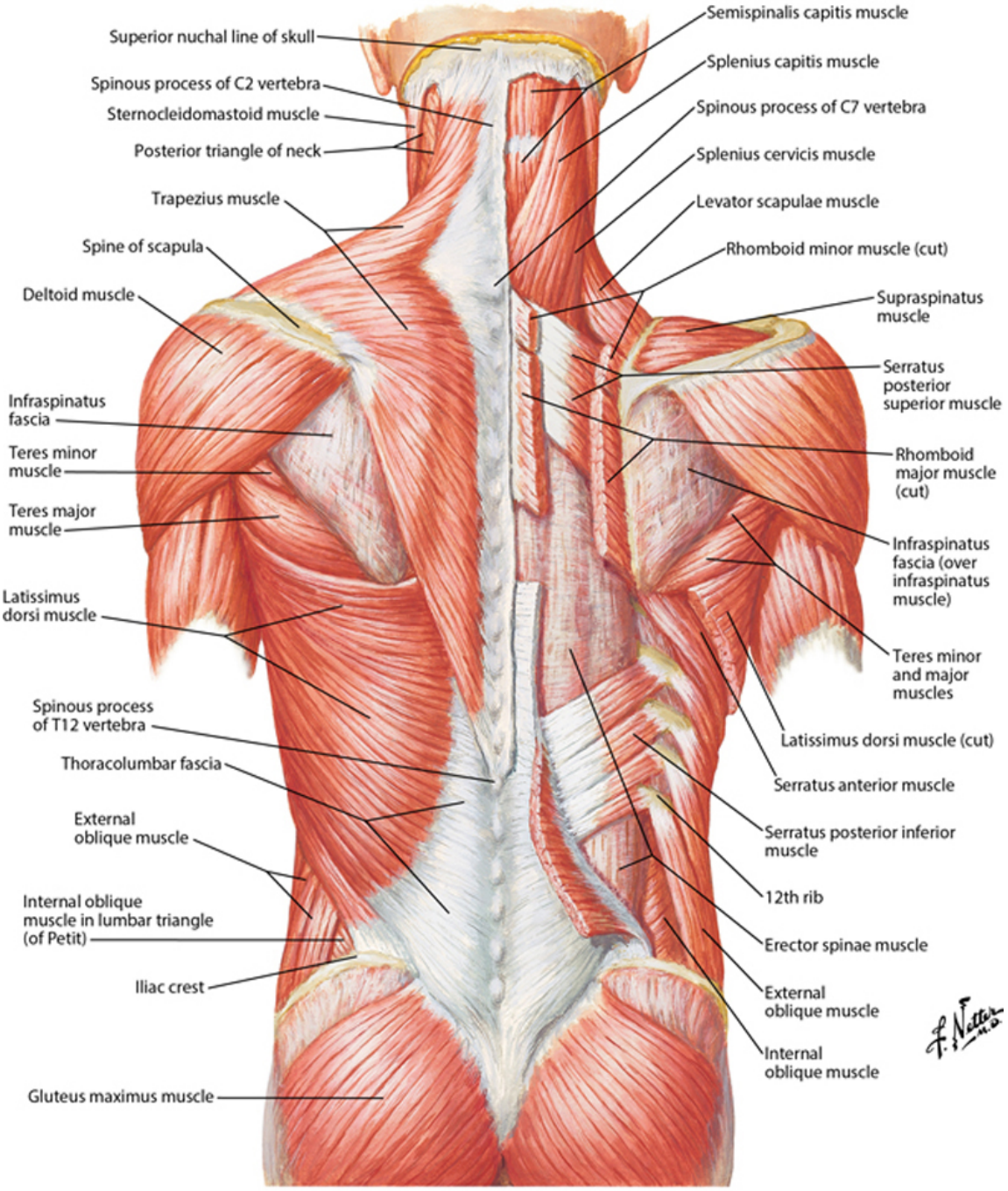
Samford University
School of Health Professions
Department of Physical Therapy

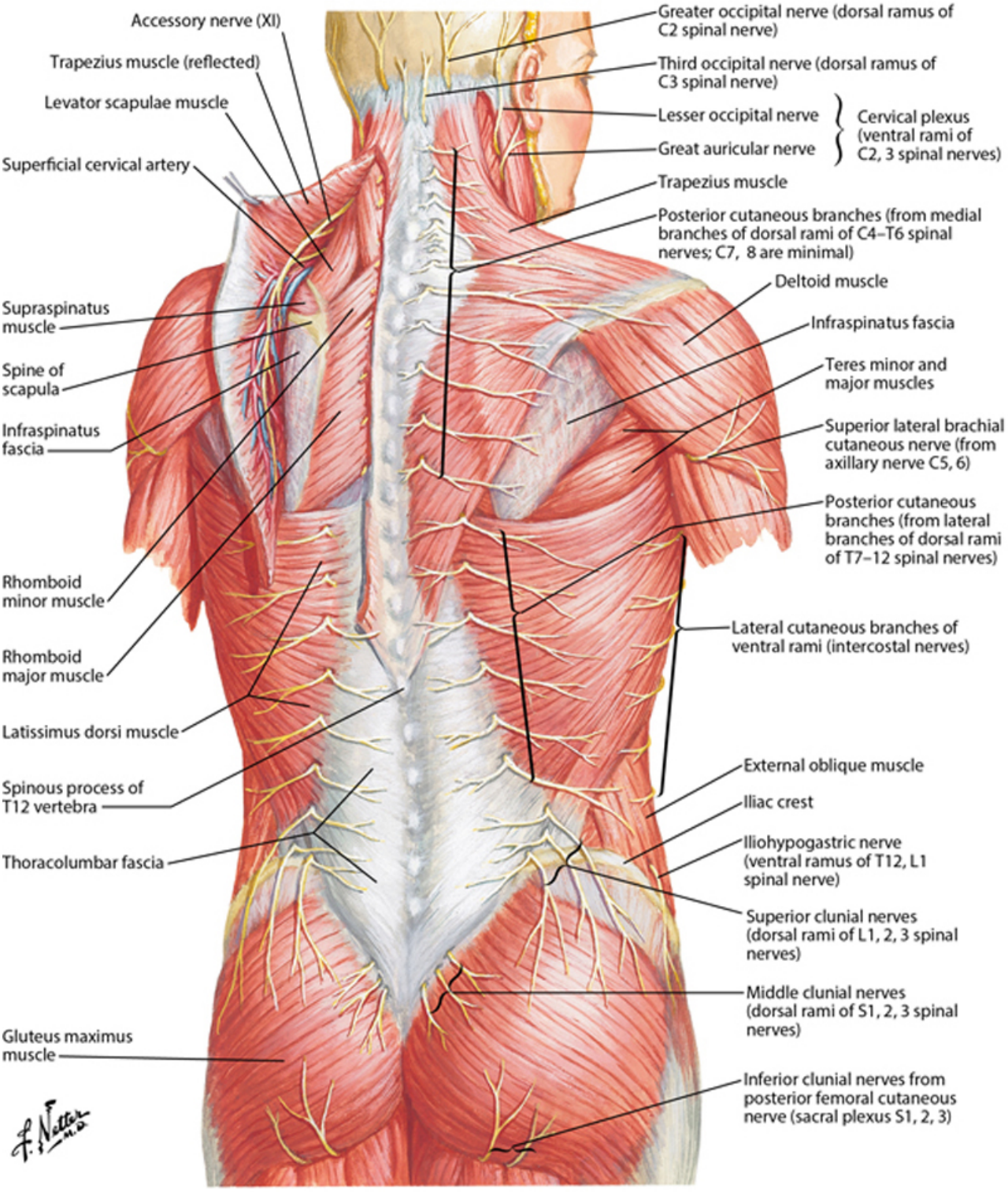
POSTERIOR CERVICAL: Dissection Instructions

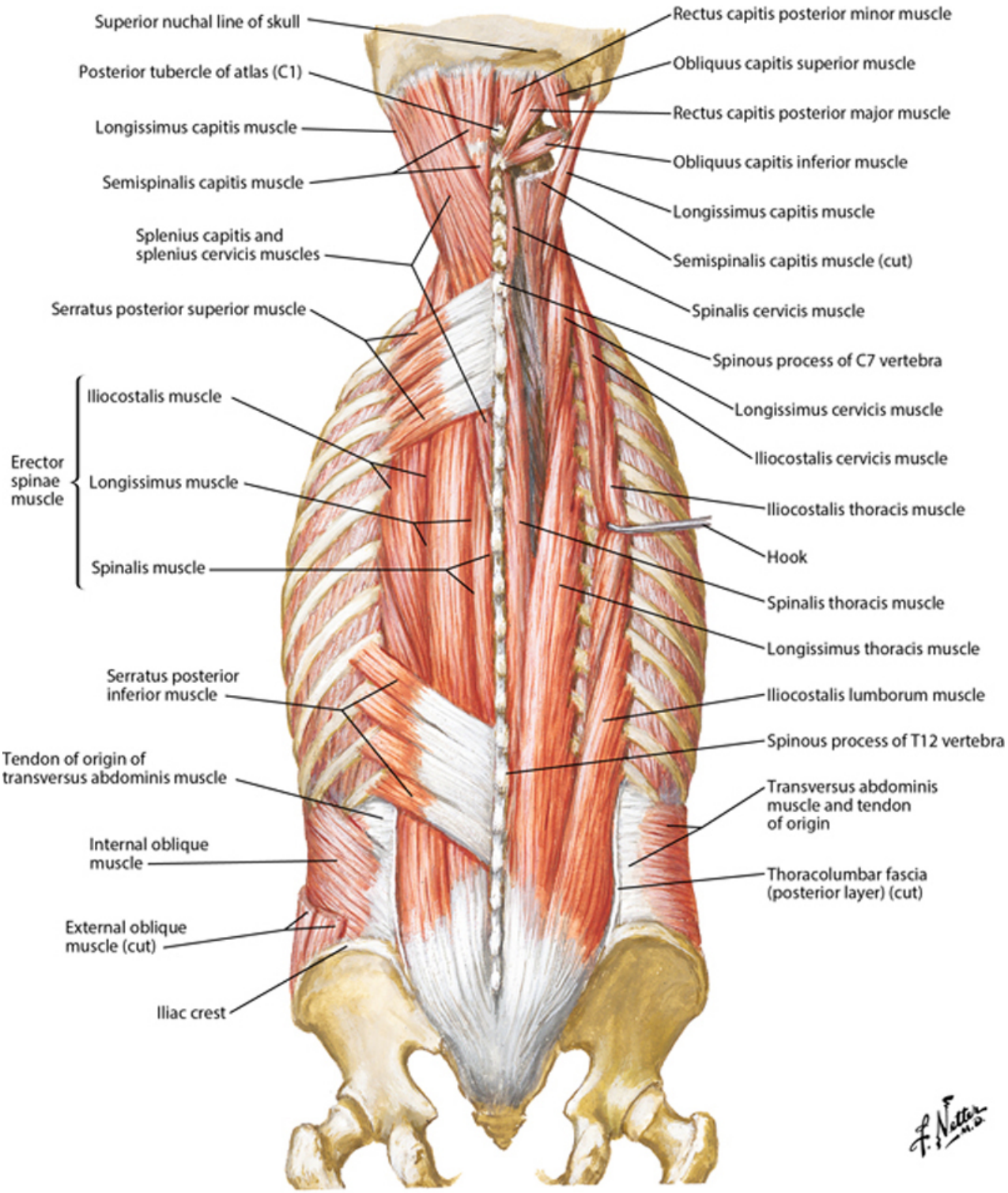
Structure List:

Muscles	Nerves	Other Structures
upper trapezius	**suboccipital**	occipital artery
levator scapulae		**vertebral artery**
splenius capitis		
semispinalis capitis		
semispinalis cervicis		
obliquus capitis inferior		
rectus capitis posterior major		
rectus capitis posterior minor		
obliquus capitis superior		

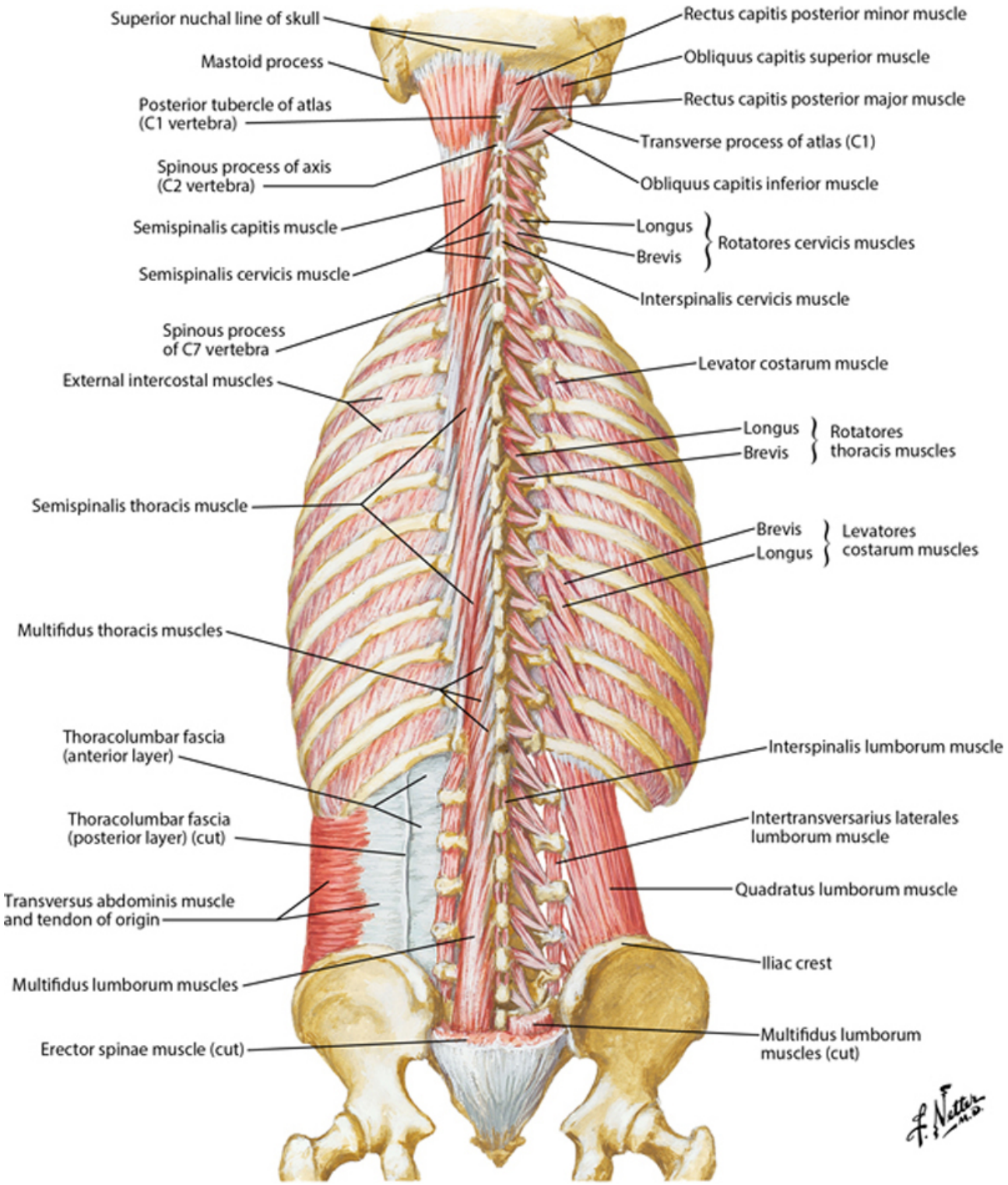
1. Make skin incisions in the midline from the external occipital protuberance to the base of the cervical spine. Note that the skin in this region is ~6mm think, so only the tip of the scalpel should be used. Reflect the skin laterally or remove and place in tissue container.
2. Locate the **upper trapezius muscle** and detach or reflect the trapezius muscle to find the **levator scapulae muscle** and the **splenius capitis muscle**.
3. Identify the **semispinalis capitis muscle**, which lies deep to the splenius capitis muscle.
4. Detach or reflect the semispinalis capitis and splenius capitis muscles from the occipital bone. Deep to the semispinalis capitis muscle is the **semispinalis cervicis muscle**. Verify that the superior attachment of the semispinalis cervicis is the spinous process of the axis (C2).
5. Identify and clean the **obliquus capitis inferior muscle** and observe that it forms the inferior boundary of the suboccipital triangle. Verify that the medial attachment of the obliquus capitis inferior muscle is the spinous process of the axis (C2), whereas the lateral attachment is the transverse process of the atlas (C1).
6. Identify and clean the **rectus capitis posterior major muscle**, which forms the medial boundary of the suboccipital triangle. Confirm that the medial attachment of the rectus capitis posterior major muscle is the spinous process of the axis, whereas the lateral attachment is the inferior nuchal line of the occipital bone laterally.
7. Identify and clean the **rectus capitis posterior minor muscle**. Confirm that the inferior attachment of the rectus capitis posterior minor muscle is the posterior tubercle of the atlas (C1), whereas its superior attachment is the inferior nuchal line of the occipital bone medially.
8. Identify and clean the **obliquus capitis superior muscle**, which forms the lateral boundary of the suboccipital triangle. Confirm that the inferior attachment of the obliquus capitis superior muscle is the transverse process of the atlas and its superior attachment is the occipital bone between the lateral aspect of the superior and inferior nuchal lines.
9. Identify and clean the contents of the suboccipital triangle: **suboccipital nerve** and **vertebral artery**. The suboccipital nerve emerges between the occipital bone and the atlas. The vertebral artery is deep within the suboccipital triangle.
10. Clinical application: Consider disarticulating the cervical facet joints.

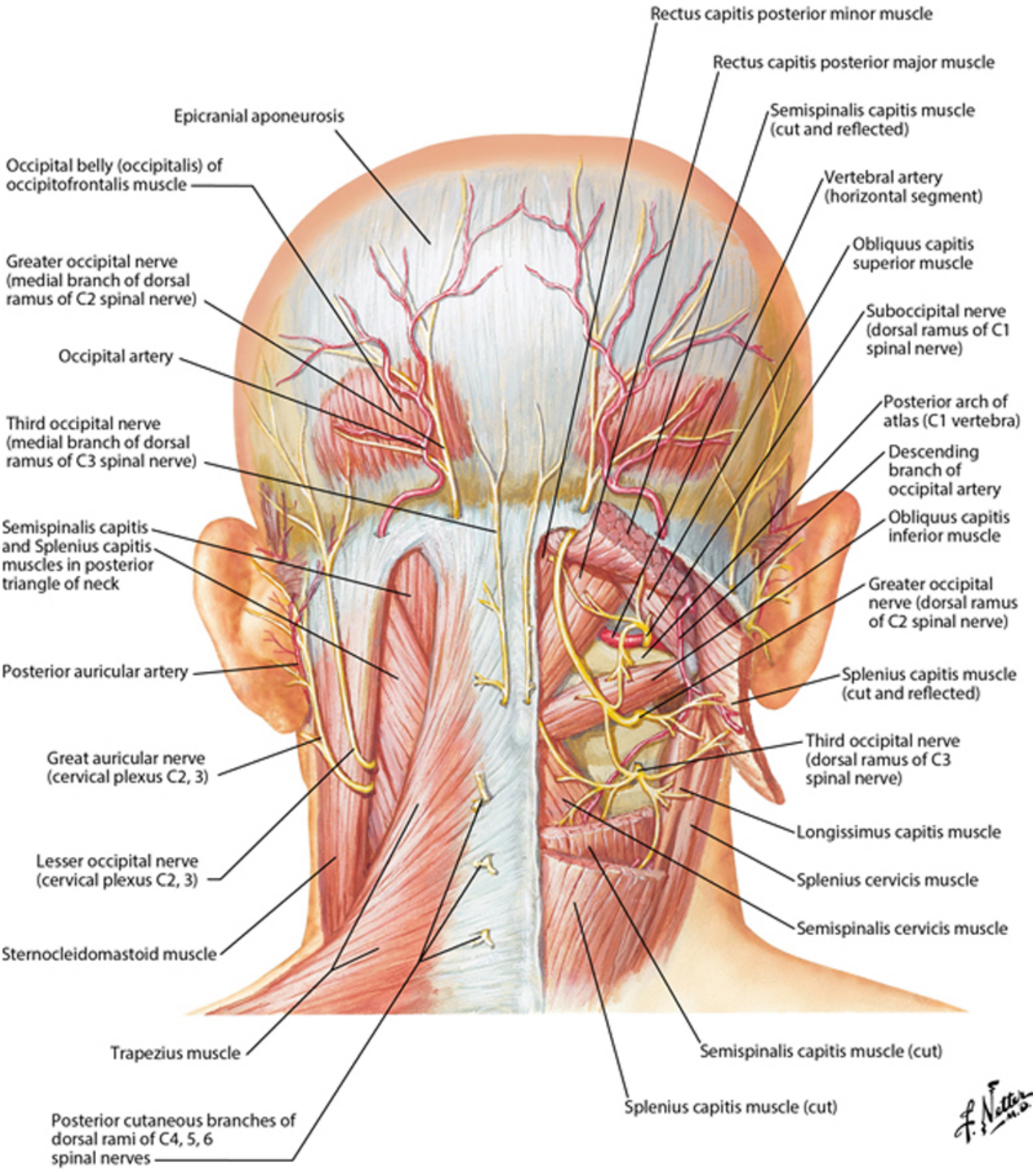


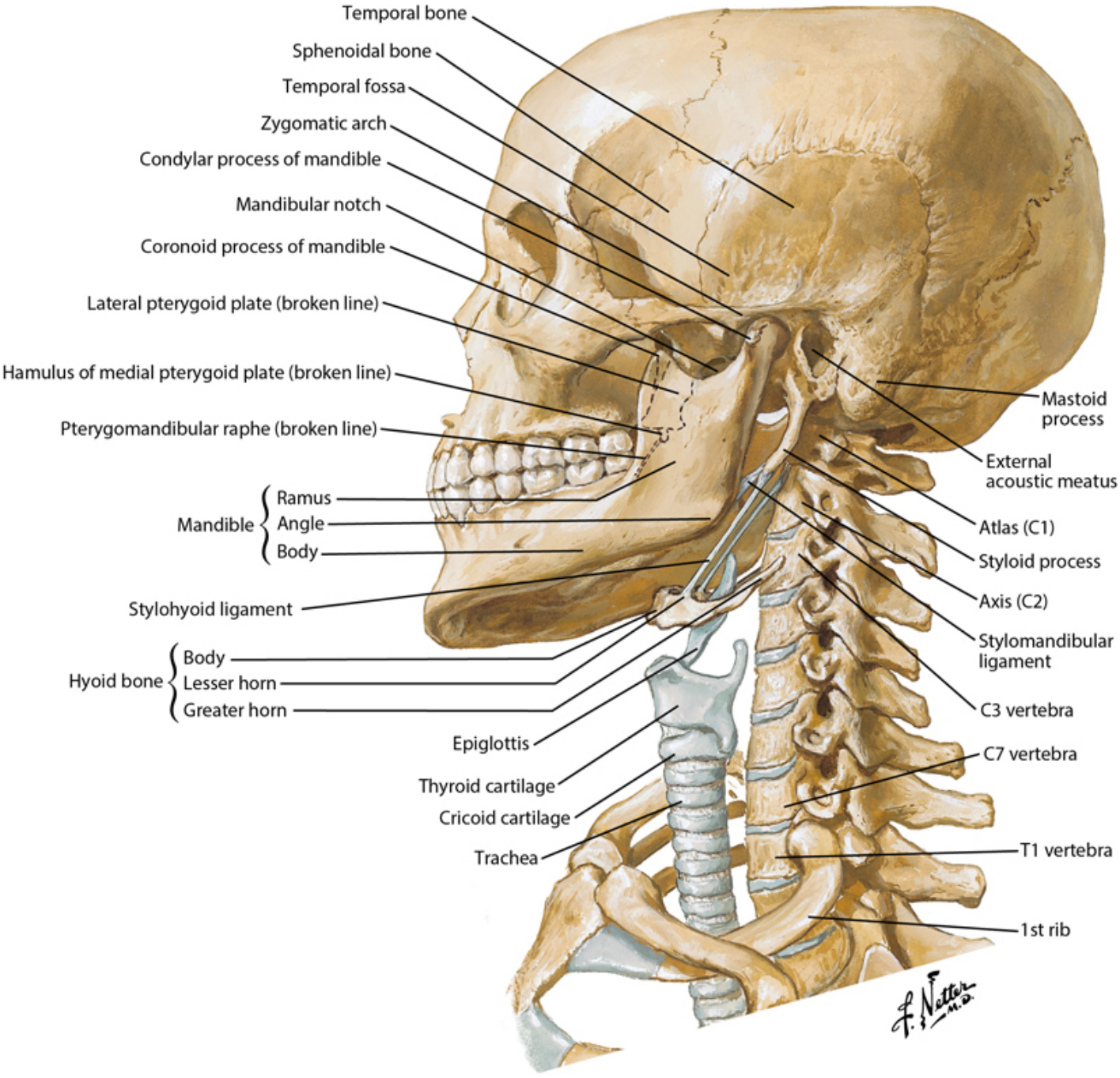




Samford University
School of Health Professions
Department of Physical Therapy







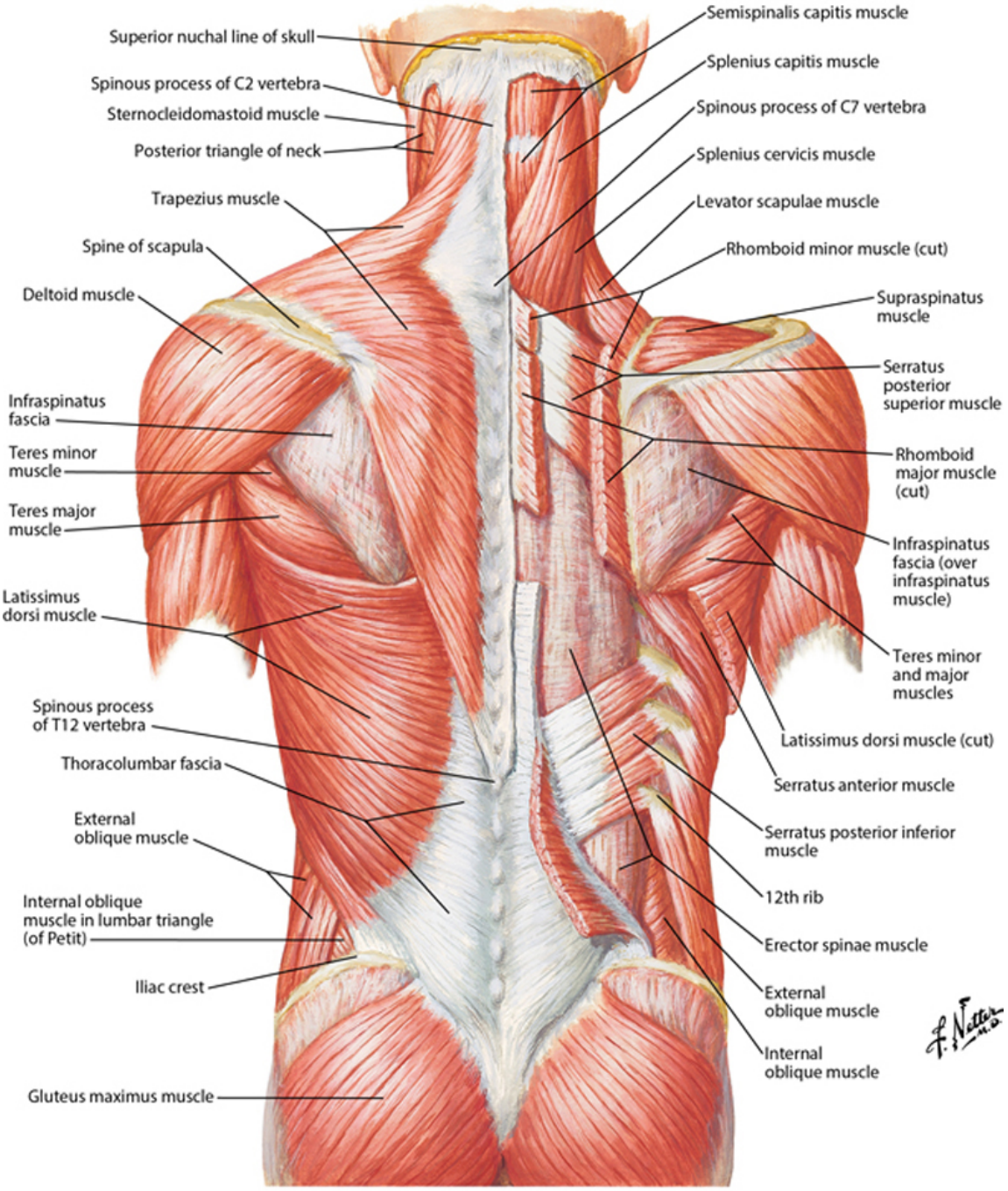
Samford University
School of Health Professions
Department of Physical Therapy

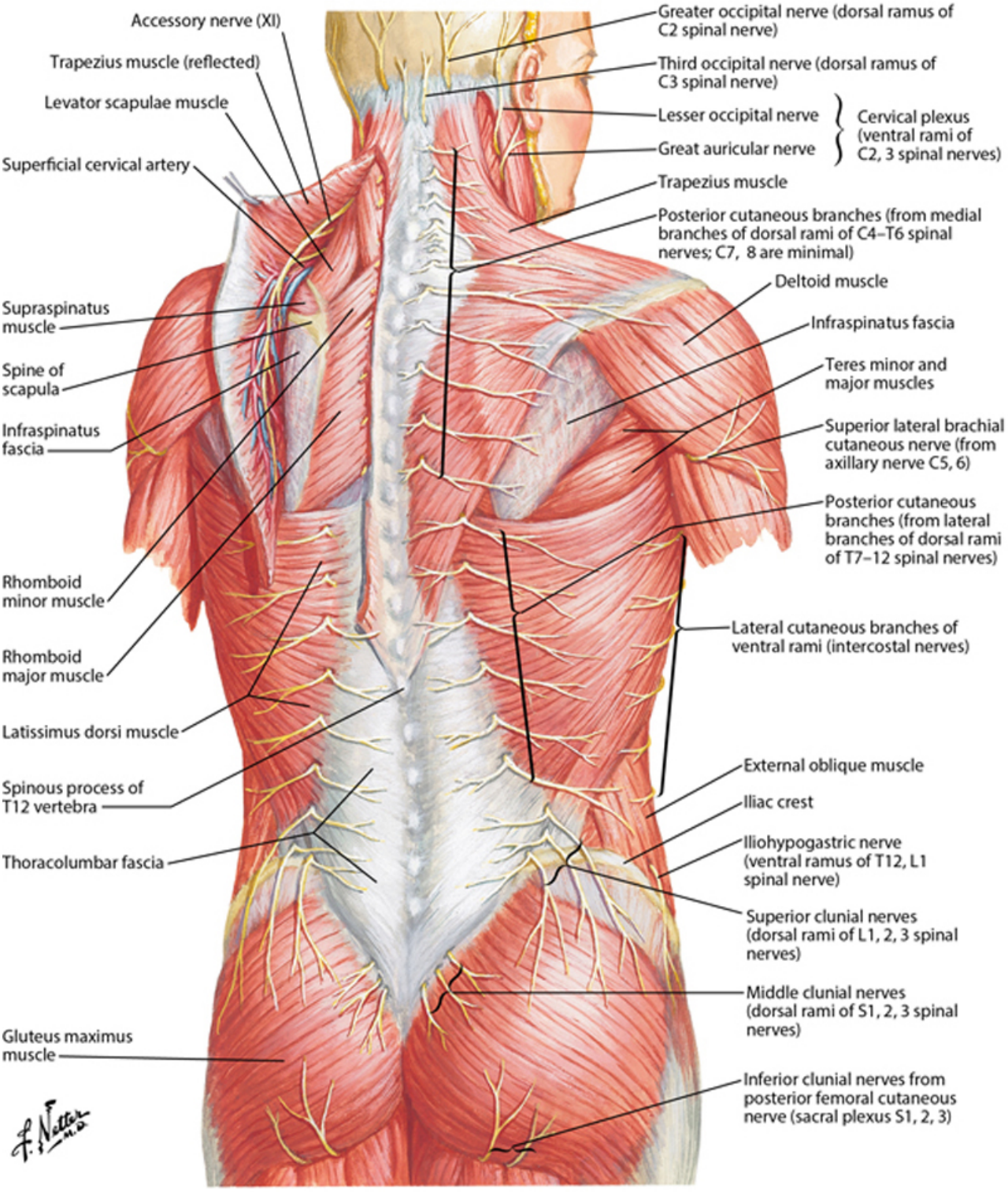
POSTERIOR THORACIC: Dissection Instructions

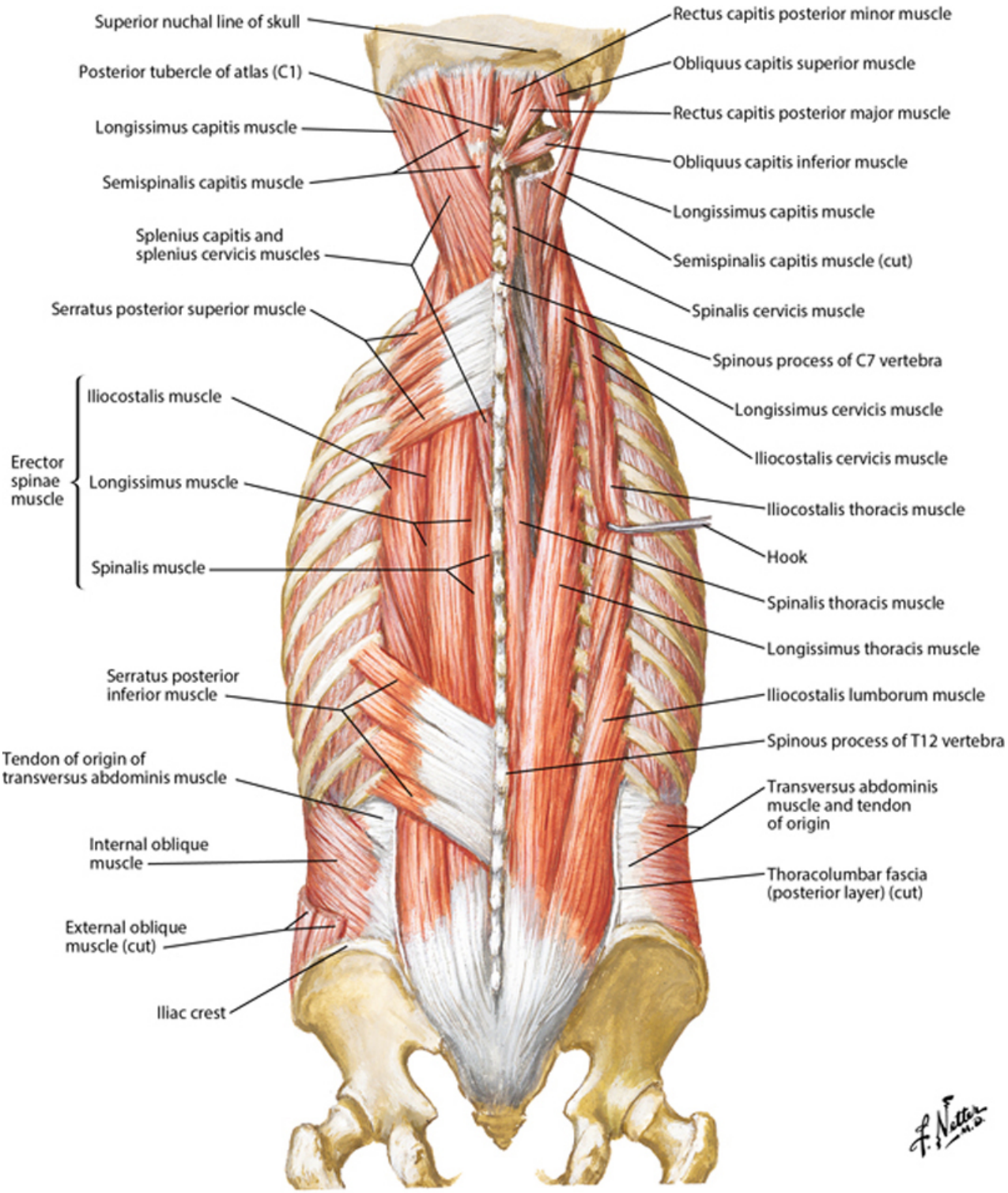
Structure List:

Muscles	Nerves	Other Structures
trapezius **rhomboid major & minor** **levator scapulae** **serratus posterior superior** spinalis, longissimus, & iliocostalis long & short rotatores	dorsal scapular	**spinal cord**

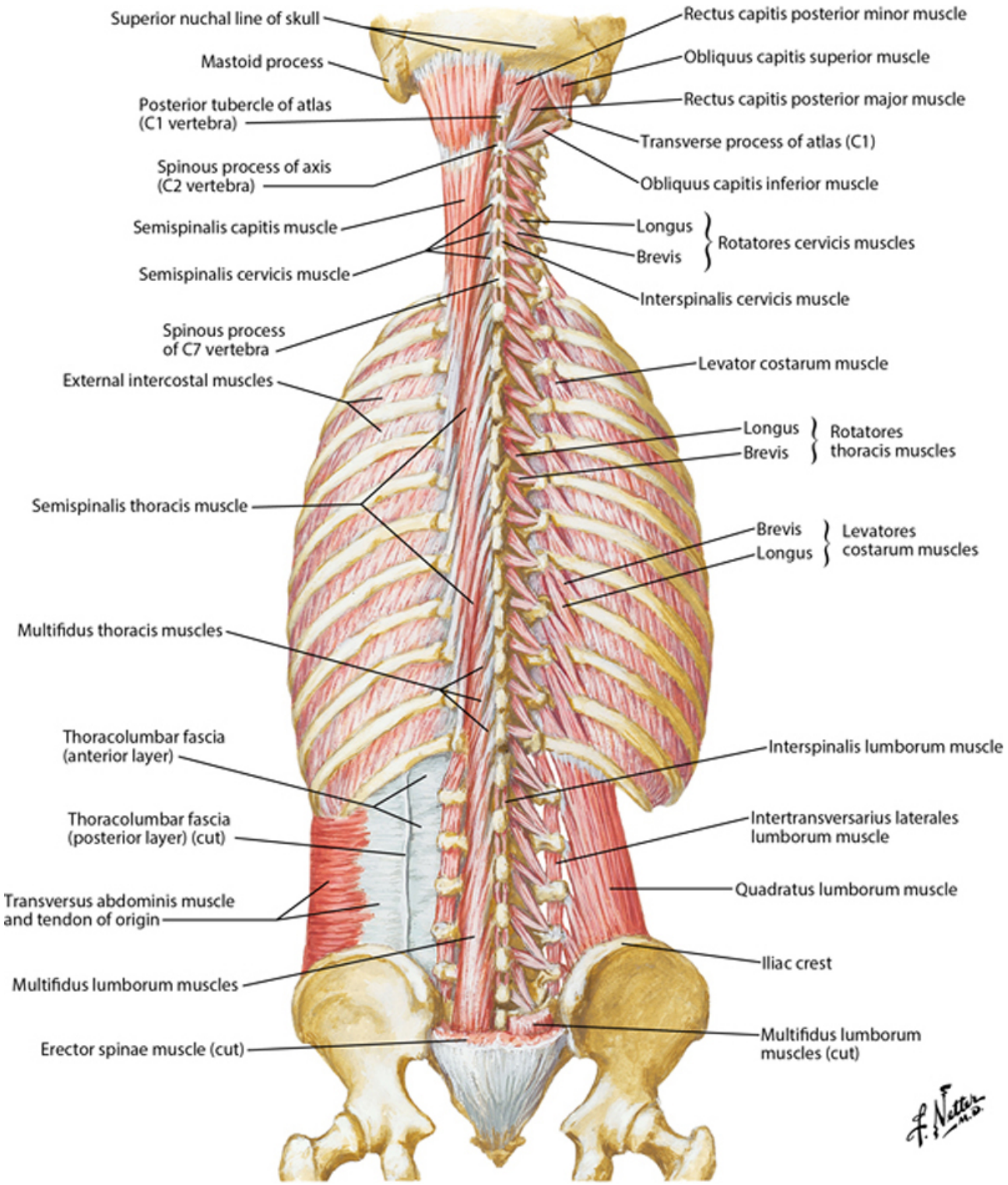
1. Make skin incisions down the midline of the thoracic spine and reflect skin laterally.
2. Identify and clean the **trapezius muscle**. To prepare the trapezius for reflection, insert your fingers deep to the inferolateral border and break the connective tissue between the trapezius and the deeper muscles.
3. Cut trapezius from spinous processes and reflect laterally. Identify and clean the **rhomboid major and minor muscles**.
4. Cut rhomboid from spinous processes and reflect laterally. On the deep surface of the rhomboid, find the **dorsal scapular nerve**.
5. Identify the **levator scapulae muscle** inserting onto the superior angle of the scapula.
6. Identify and **serratus posterior superior muscle**, deep to the rhomboids. This muscle may have been reflected along with the rhomboids, so look on the deep surface of the reflected rhomboids if you can't find it. Cut and reflect serratus posterior superior muscle.
7. Identify and clean the erector spinae muscles: **spinalis, longissimus, and iliocostalis muscles**.
8. Cut and reflect the erector spinae muscles to identify the **long and short rotatores muscles**.
9. Clinical Application: Consider using a chisel and mallet to remove the posterior arch of some of the vertebrae (laminectomy), to view the **spinal cord**.

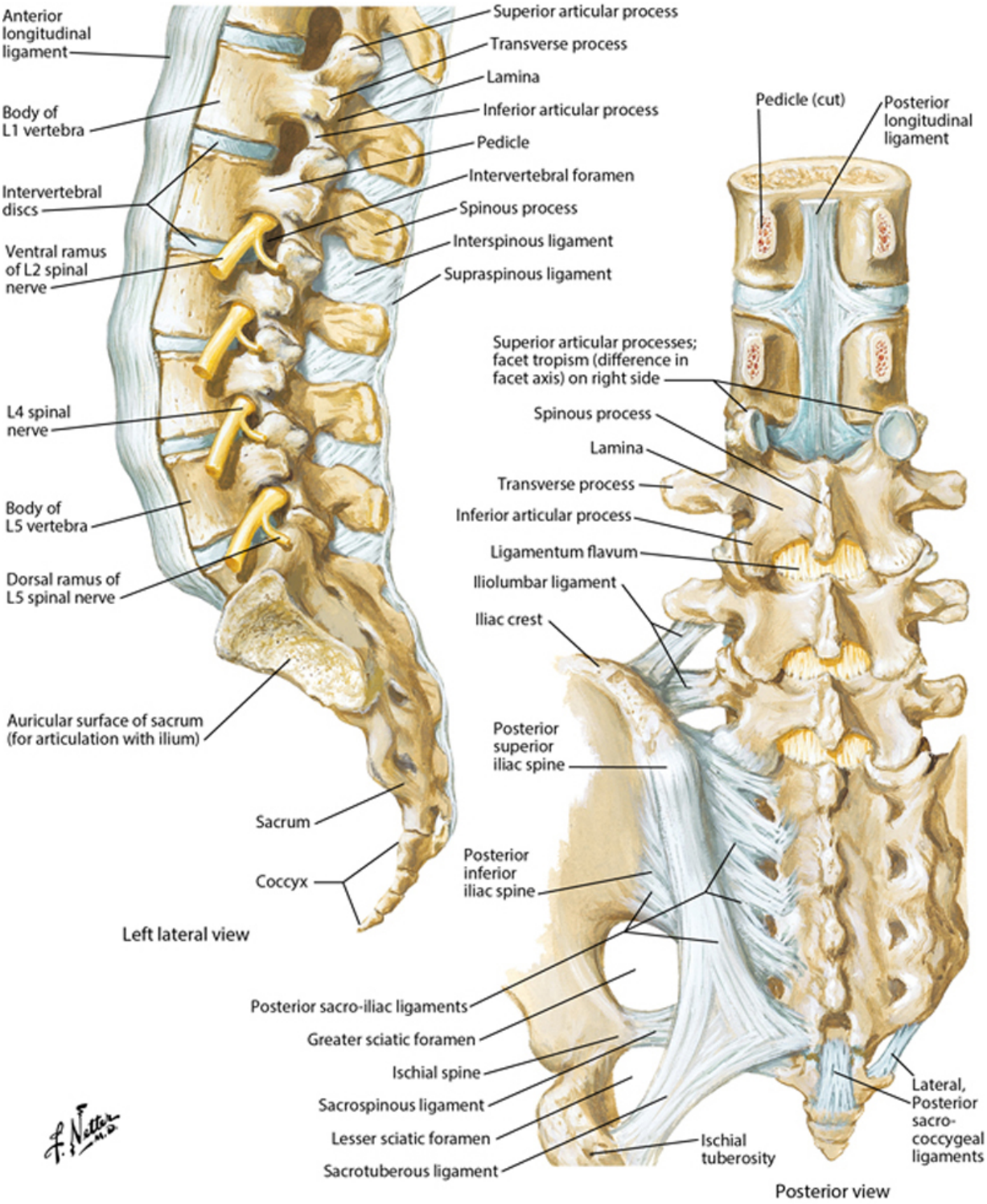


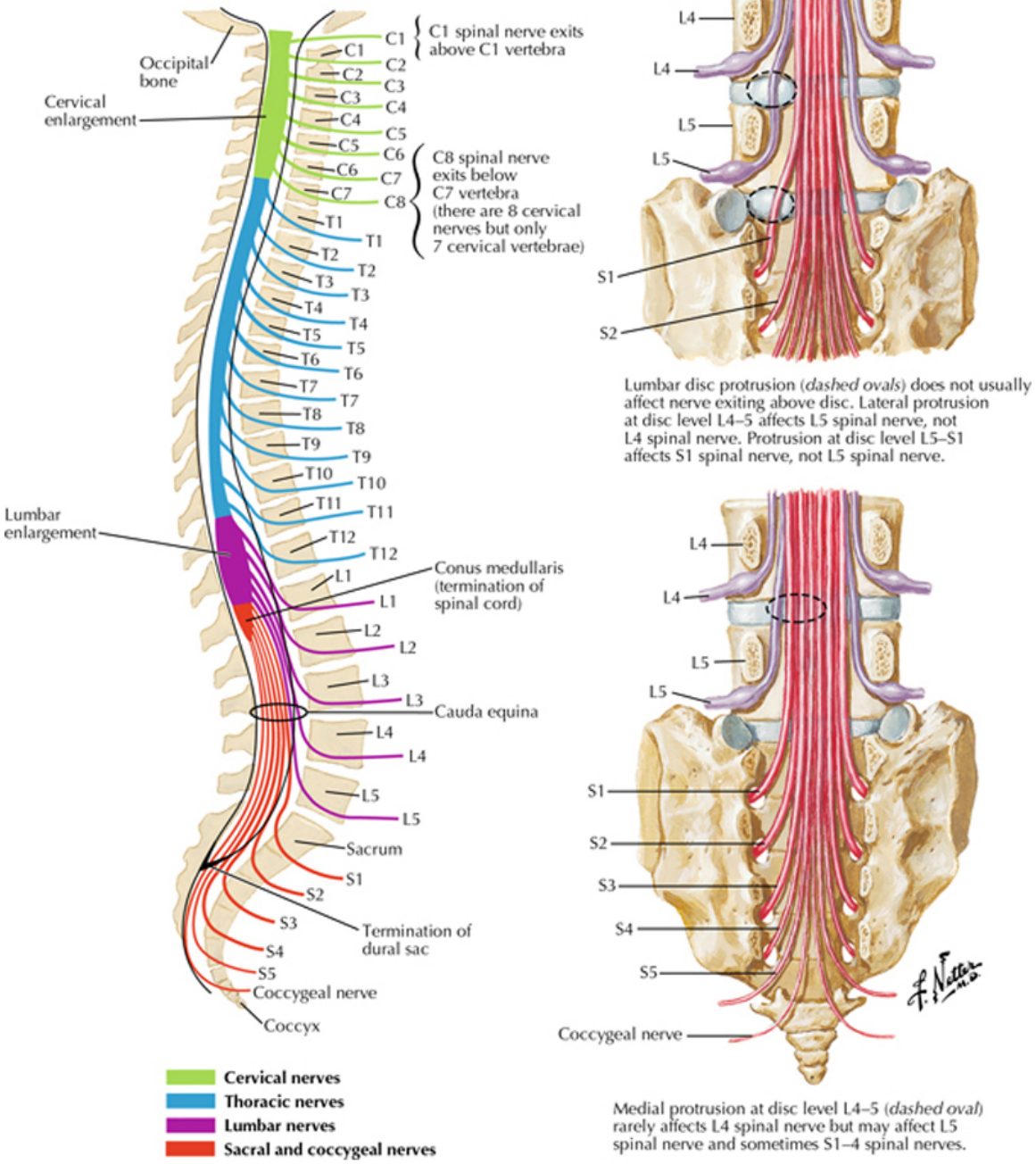




Samford University
School of Health Professions
Department of Physical Therapy







Samford University
School of Health Professions
Department of Physical Therapy

SESSION 6b

TITLE:
Cadaveric Dissection Lab: Hands On To Help Remember Again What You May Have Forgotten!

DATE OF COURSE:
Saturday, August 17, 2019, 2:35-5:35pm

COURSE LOCATION:
Samford University, Propst Hall, rooms 238 & 242 (Propst Hall is #40 on the attached map)

COURSE DESCRIPTION:
Clinical anatomy remains a cornerstone in the training of physical therapists. A comprehensive knowledge of anatomy is essential for the skillful practice of neuromusculoskeletal rehabilitation. Through guided cadaveric dissection of the spine, this lab-based course will provide a review of gross anatomy related to the cervical, thoracic, lumbar, and sacroiliac regions. The anatomy revealed during dissection lab will be applied to physical therapy examination, evaluation, and differential diagnosis strategies. Each attendee will take an active role in the cadaveric dissections.

Participants will be expected to arrive wearing appropriate clothing for the cadaver lab, which includes long pants, such as scrubs, and closed-toed shoes. Long hair should be tied back, and contact lenses should be worn at the participant's discretion, with spectacles being recommended.

All other materials, including dissection supplies, will be provided on site.

COURSE OBJECTIVES:
1. Recognize, label, and differentiate between specific anatomic structures in the spine.
2. Explain the function of specific anatomic structures in the spine.
3. Apply anatomy to support evidenced-based physical therapy examination, evaluation, and differential diagnosis strategies.

All lectures in Propst Hall Room 238
All dissections in Propst Hall Room 242

Samford University
School of Health Professions
Department of Physical Therapy

Session 6b: Saturday, August 17th, 2019, 2:35-5:35pm

Region: Lumbopelvic

2:35-2:45 Review cervicothoracic case, clinical pearls

2:45-2:55 Present lumbopelvic case

3:00-4:30 Cadaveric dissection
3 regions will be dissected on 3 different cadavers
Participants will be divided into 3 groups, each group dissects a different region
Each region will have a structure list and dissection guide
- Anterior lumbar, pelvic floor
- Posterior lumbar
- Posterior hip

Goal is for each group to find all structures on their list, focusing on the bold structures

4:30-5:35 Groups will review their dissections with the class
Clinical application and open dissection
Closing remarks, course survey

Samford University
School of Health Professions
Department of Physical Therapy

LUMBOPELVIC CASE

Subjective:

A 36-year-old male construction worker self-referred to an outpatient physical therapy clinic with a complaint of low back pain and pain radiating from his posterior left hip all the way to his lateral L foot. He first experienced pain 3 weeks ago while doing a home maintenance project. The onset of pain occurred when he attempted to lift an air conditioning unit. He reports that as he bent over to lift the unit, he experienced an intense, stabbing pain and immediately fell to the ground. He required assistance from his wife to walk back into the house. For the first 24 hours after the incident, he rested prone on a couch or on his bed. Over the past 3 days, he reports an improved tolerance to walking and standing for short periods. However, he rates his current pain level 5/10 and he continues to experience radiating pain distal to his L knee. His goal is to return to work as soon as possible.

Objective:

Posture: Patient stands with a lateral shift to the R and a flattened thoracolumbar spine.

ROM: Lumbar spine flexion is 10% of normal (limited by LBP), extension is 80% of normal.

MMT: See neuro testing

Palpation: Tenderness and muscle guarding noted at lumbar erector spinae musculature, R quadratus lumborum, L psoas. Pelvic imbalance was noted via palpation of ASISs and PSISs in standing, supine, and prone; R ASIS lower than L.

Neuro: Patella reflex (L3/L4) diminished on L (1+) and normal on R (2+). Myotomal testing revealed involvement of L4 and L5 myotomes indicated by weakness in L tibialis anterior and EHL. No weaknesses noted during remaining MMTs. Diminished sensation to light touch and pinprick in L L5 and S1 dermatomes. Positive SLR and Slump test on L.

Special Tests: Skin rolling demonstrated significant decrease in fascial mobility in central region of L1-L5[1]. Disc shear test positive at L4-L5.

Specific Joint Mobility Testing: Hypomobilities noted at T10-L4. L4/L5 was found to be hypermobile.

Assessment:

Based on the history, observation, and physical findings, this patient is hypothesized to have an L4/L5 HNP with concomitant segmental instability. The positive neuro tests suggest nerve root (radicular) involvement, and treatment should initially focus on decreasing this nerve root compression/irritation[2,3]. The joint hypermobility and positive disc shear at L4/L5 suggests disc compromise and segmental instability[4].

Plan:

The treatment plan for this patient with a suspected L4/L5 HNP is to enhance lumbopelvic dynamic stability, improve joint and soft tissue mobility, and fully restore his ability to work and perform ADLs. Treatment will include soft tissue and joint mobilizations, MET, and therapeutic exercise. Soft tissue and joint mobilizations will be used to increase joint mobility, inhibit pain, lubricate joints, inhibit muscle guarding, improve motor recruitment, and improve proprioceptive awareness[7]. MET will be used to address pelvic obliquities[8], which is likely resulting from muscle guarding or lifting a heavy load[9]. Therapeutic exercise will be specifically dosed to respect the patient's current level of impairment and will be progressed in order to train for each functional quality, with the primary functional qualities emphasized being vascularization[5,6] and endurance[10]. The patient will be educated on his current condition and treatment expectations, which can lead to better compliance and overall outcomes. Prior to discharge from PT, we will include education regarding continued self-care, ergonomics, and incorporation of rest breaks to prevent or decrease likelihood of recurrent bouts of back pain.

1. Sherman KJ, Dixon MW, Thompson D, Cherkin DC. Development of a taxonomy to describe massage treatments for musculoskeletal pain. *BMC Complement Altern Med.* 2006;6:24.
2. Deville WL, van der Windt DA, Dzaferagic A, Bezemer PD, Bouter LM. The test of Lasegue: systematic review of the accuracy in diagnosing herniated discs. *Spine.* 2000;25:1140-1147.
3. Rabin A, Gerszten PC, Karausky P, Bunker CH, Potter DM, Welch WC. The sensitivity of the seated straight-leg raise test compared with the supine straight-leg raise test in patients presenting with magnetic resonance imaging evidence of lumbar nerve root compression. *Arch Phys Med Rehabil.* 2007;88:840-843.
4. Temes W, Karas S, Baughman E. Addition of the anterior shear test in diagnosing segmental instability: A case report. *Orthopaedic Physical Therapy Practice.* 2018;30(1):24-29.
5. Castro WH, Assheuer J, Schulitz KP. Haemodynamic changes in lumbar nerve root entrapment due to stenosis and/or herniated disc of the lumbar spinal canal—a magnetic resonance imaging study. *Eur Spine J.* 1995;4:220-225
6. Delauche-Cavallier MC, Budet C, Laredo JD, et al. Lumbar disc herniation. Computed tomography scan changes after conservative treatment of nerve root compression. *Spine.* 1992;17:927-933.
7. Kaltenborn F. *Manual Mobilization of the Joints. Volume 11: The Spine.* 4th ed. Oslo: Olaf Norlis Bokhandel; 2002
8. Timgren J, Soinila S. Reversible pelvic asymmetry: An overlooked syndrome manifesting as scoliosis, apparent leg-length difference, and neurologic symptoms. *Journal of Manipulative and Physiological Therapeutics.* 2006;29(7):561-565.
9. Gnat R, Saulicz E, Bialy M, Klaptocz. Does pelvic asymmetry always mean pathology? Analysis of mechanical factors leading to the asymmetry. *Journal of Human Kinetics.* 2009;21:23-35.
10. Abdelraouf OR, Abdel-Aziem AA. The relationship between core endurance and back dysfunction in collegiate male athletes with and without nonspecific low back pain. *Int J Sports Phys Ther.* 2016;11(3):337-344.

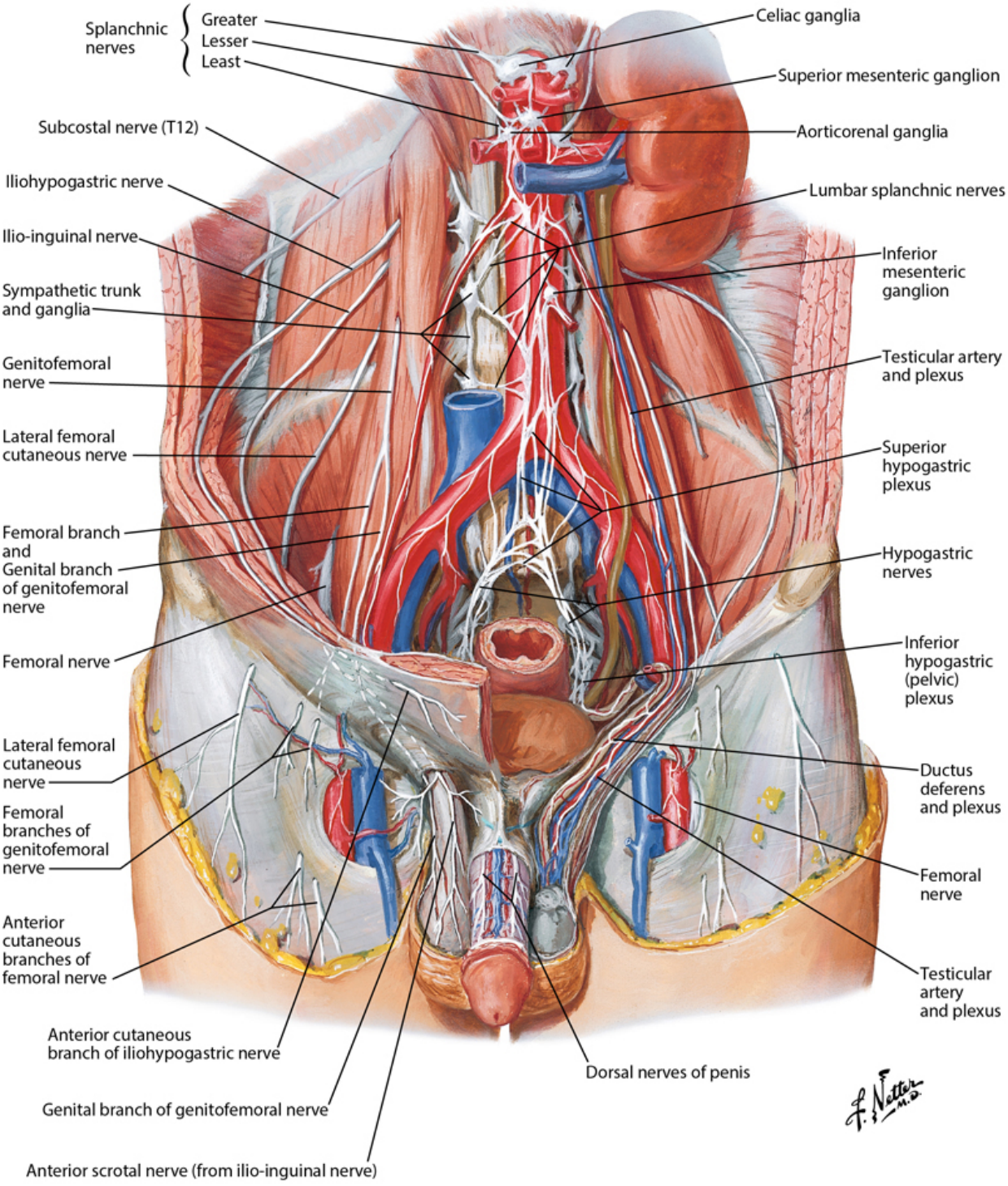
Samford University
School of Health Professions
Department of Physical Therapy

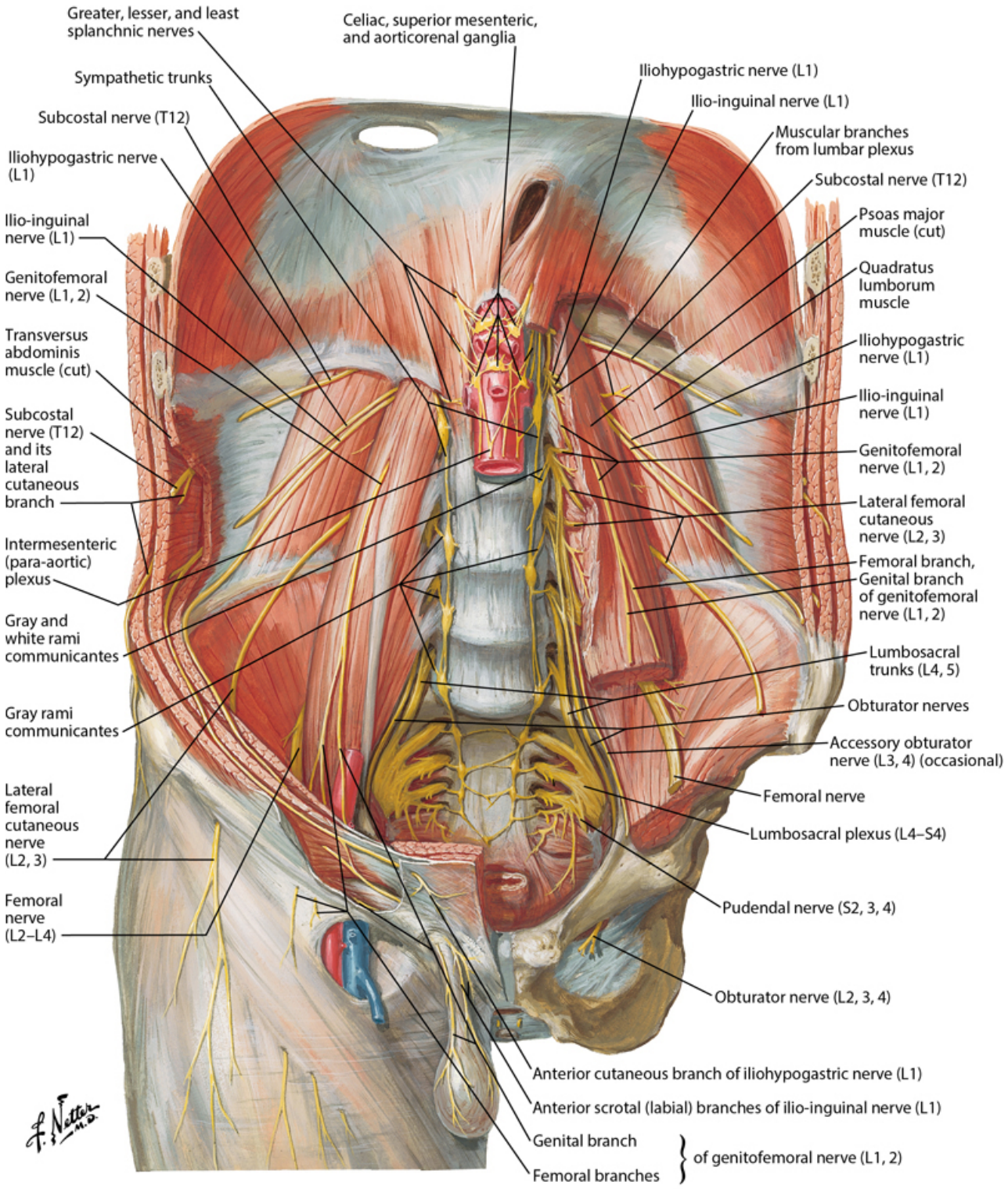
ANTERIOR LUMBER (posterior abdominal wall): Dissection Instructions

Structure List:

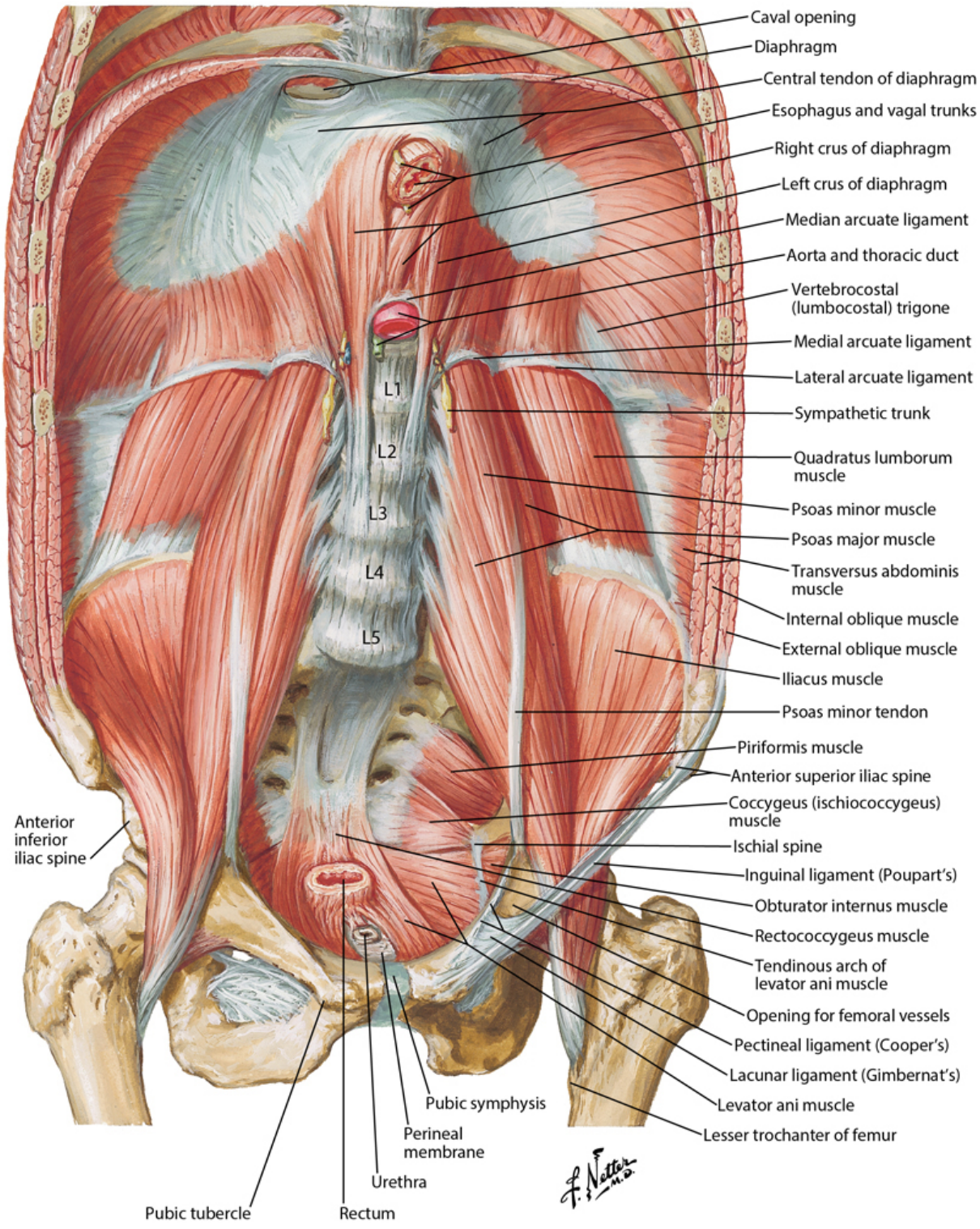
Muscles	Nerves	Other Structures
psoas major & minor	genitofemoral	**SIJ**
iliacus	subcostal	
quadratus lumborum	iliohypogastric & ilioinguinal	
transversus abdominis	lateral cutaneous nerve of the thigh	
	femoral	
	obturator	
	lumbosacral trunk	

1. Remove the abdominal viscera. Be careful not to puncture the intestines!
2. Identify and clean the **psoas major and minor muscles**. The psoas minor will have a long flat tendon passing down the anterior surface of the psoas major muscle.
3. Identify and clean the **iliacus muscle** and observe how the iliacus and psoas major muscles form a functional unit (iliopsoas).
4. Identify and clean the **quadratus lumborum muscle** and the **transversus abdominis muscle**.
5. Identify the lumbar plexus (L1-L4):
    a. **Genitofemoral nerve**, on the anterior surface of the posas major muscle. This nerve will divide into the genital and femoral branches superior to the inguinal ligament.
    b. **Subcostal nerve** will be 1cm inferior and parallel to the 12th rib.
    c. **Iliohypogastric and ilioinguinal nerves** will descend steeply across the anterior surface of the quadratus lumborum.
    d. **Lateral cutaneous nerve of the thigh** will pass deep to the inguinal ligament near the ASIS.
    e. Identify and clean the **femoral nerve** on the lateral side of the psoas major muscle. This nerve innervates the iliacus muscle and then passes deep to the inguinal ligament to provide motor and sensory branches to the anterior thigh.
    f. **Obturator nerve**, on the medial side of the psoas major muscle.
    g. The **lumbosacral trunk** will be medial to the obturator nerve.
6. Clinical application: Consider removing the strong anterior SIJ ligaments and disarticulating the SIJ.

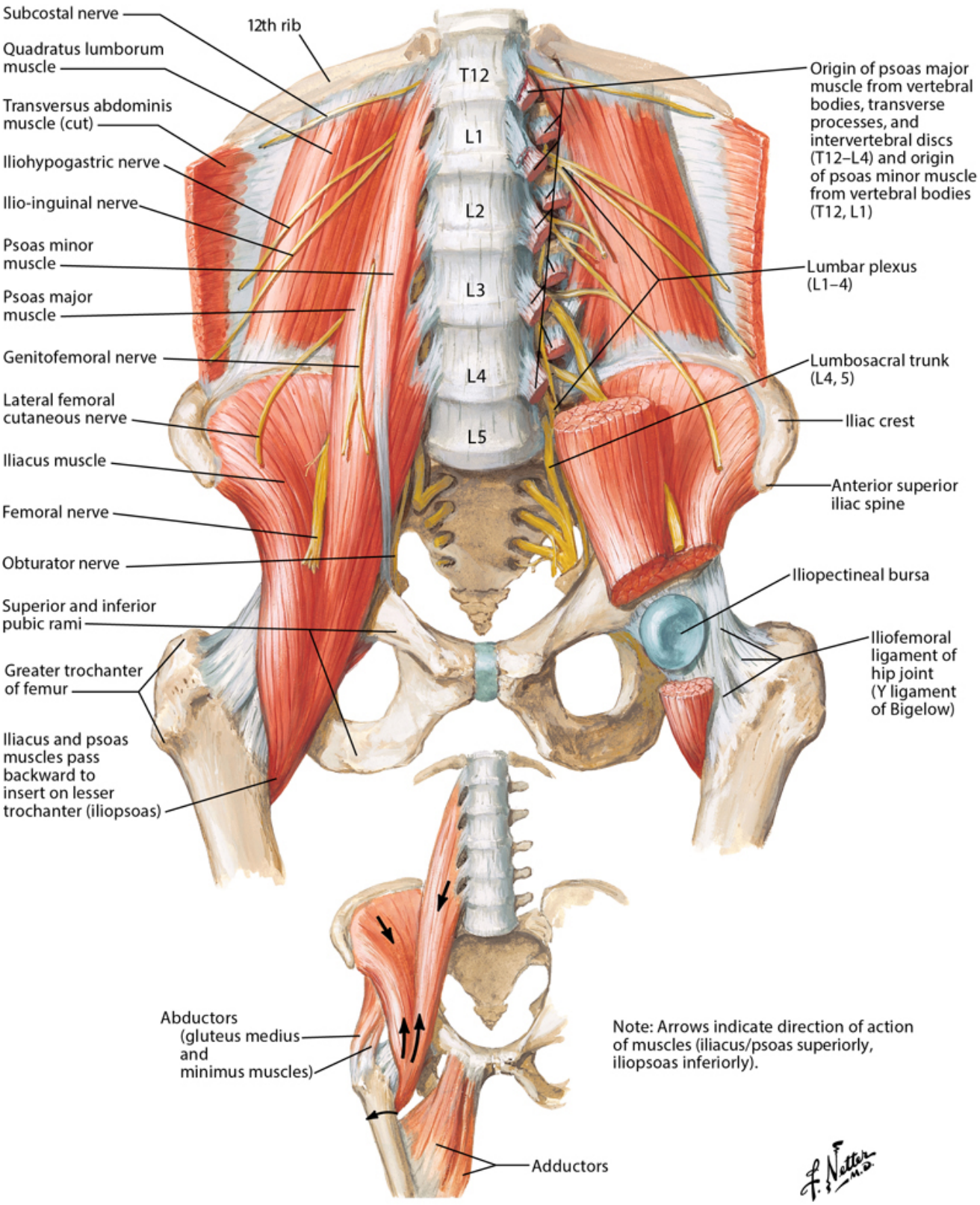


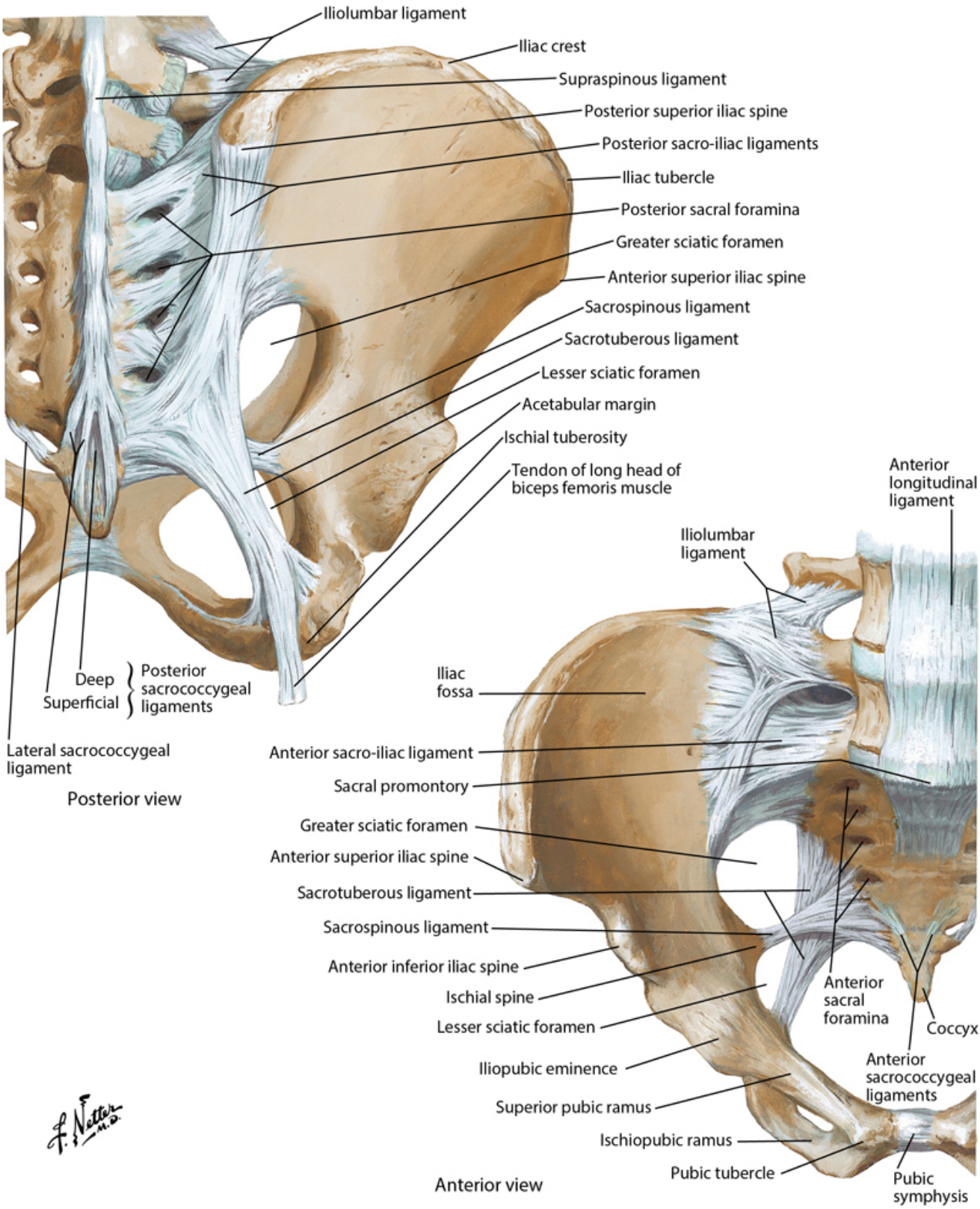


Samford University
School of Health Professions
Department of Physical Therapy



Samford University
School of Health Professions
Department of Physical Therapy





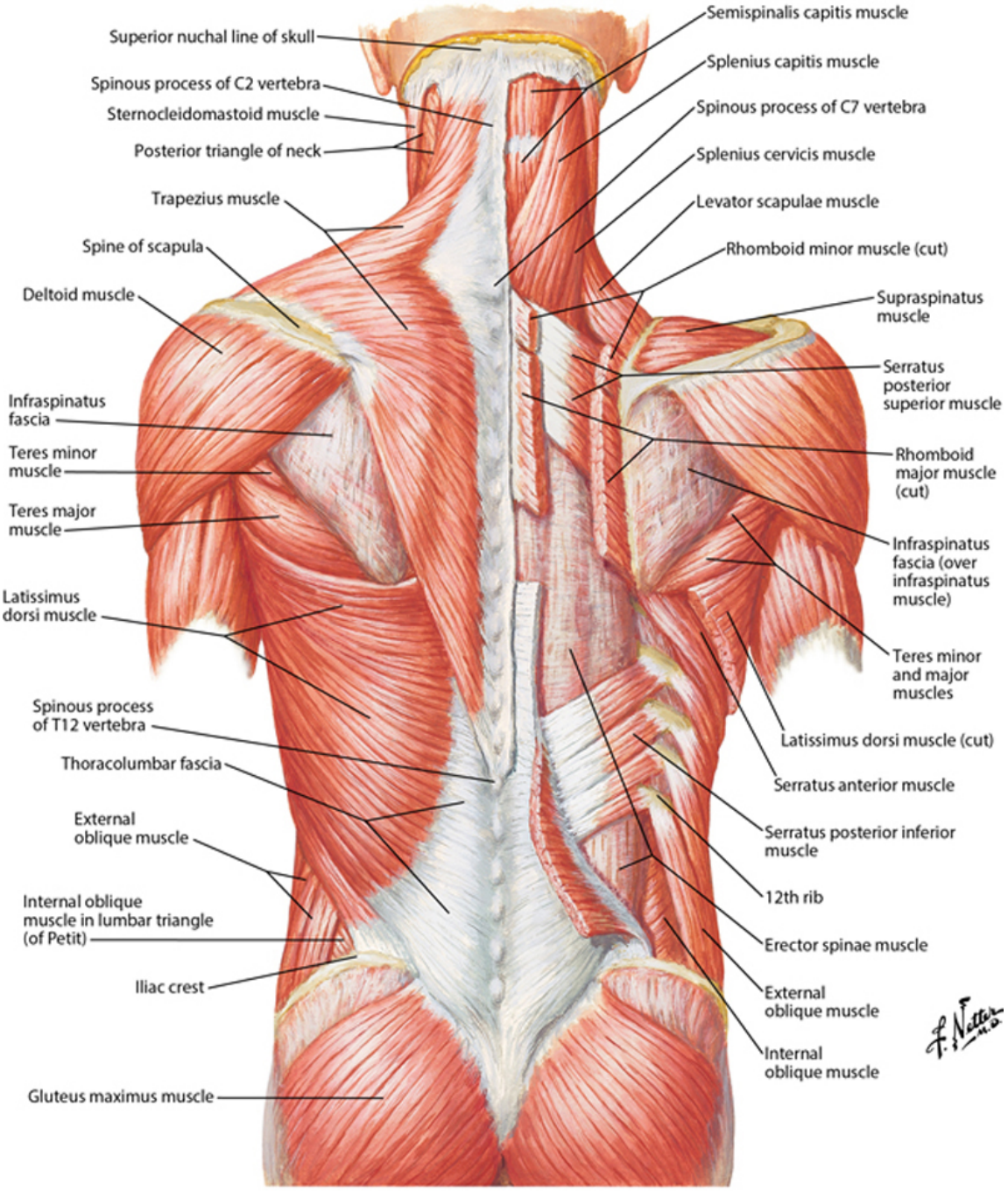
Samford University
School of Health Professions
Department of Physical Therapy

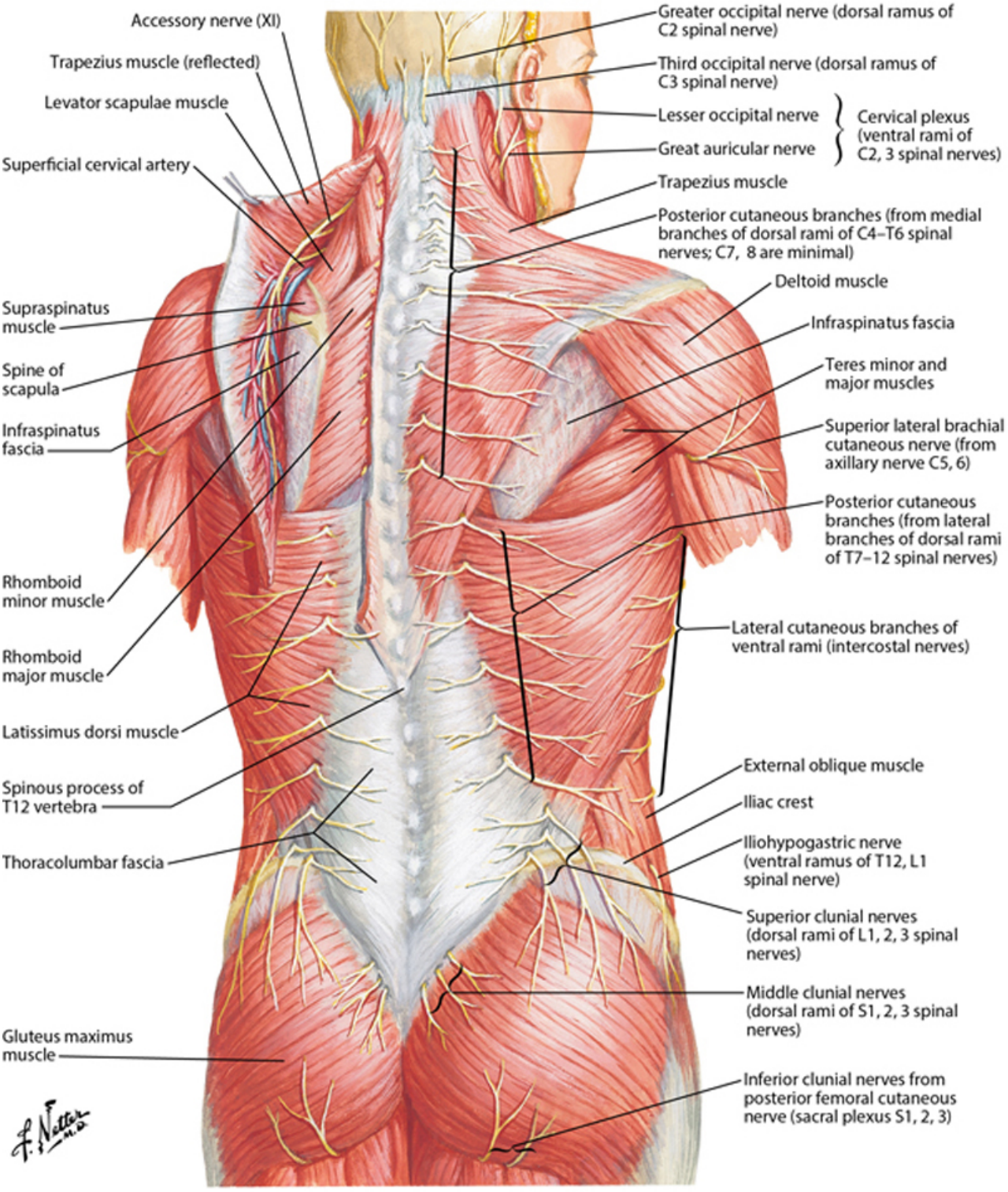
POSTERIOR LUMBAR: Dissection Instructions

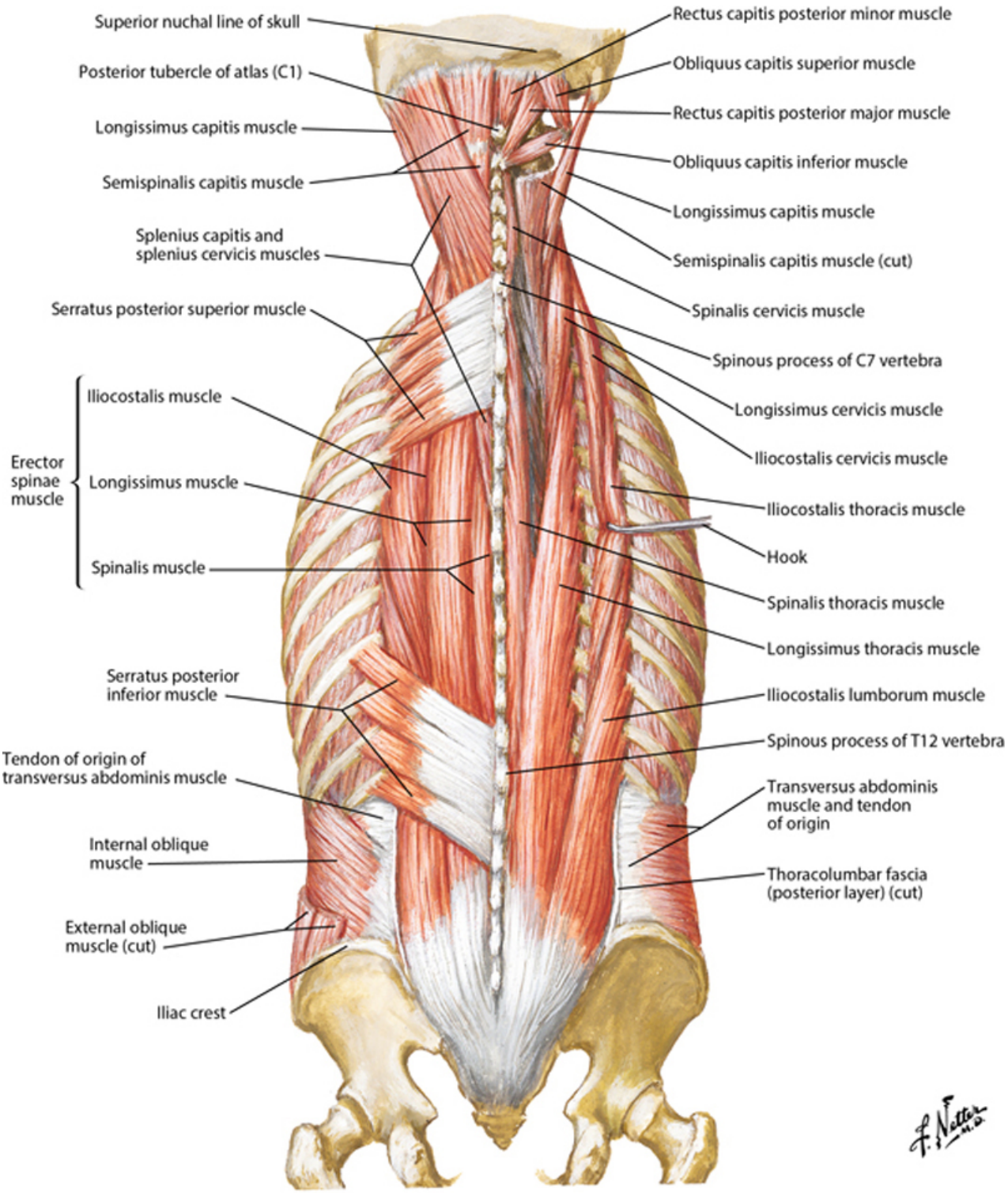
Structure List:

Muscles	Nerves	Other Structures
latissimus dorsi serratus posterior inferior **spinalis, longissimus, & iliocostalis** **multifidus**		thoracolumbar fascia **SIJ**

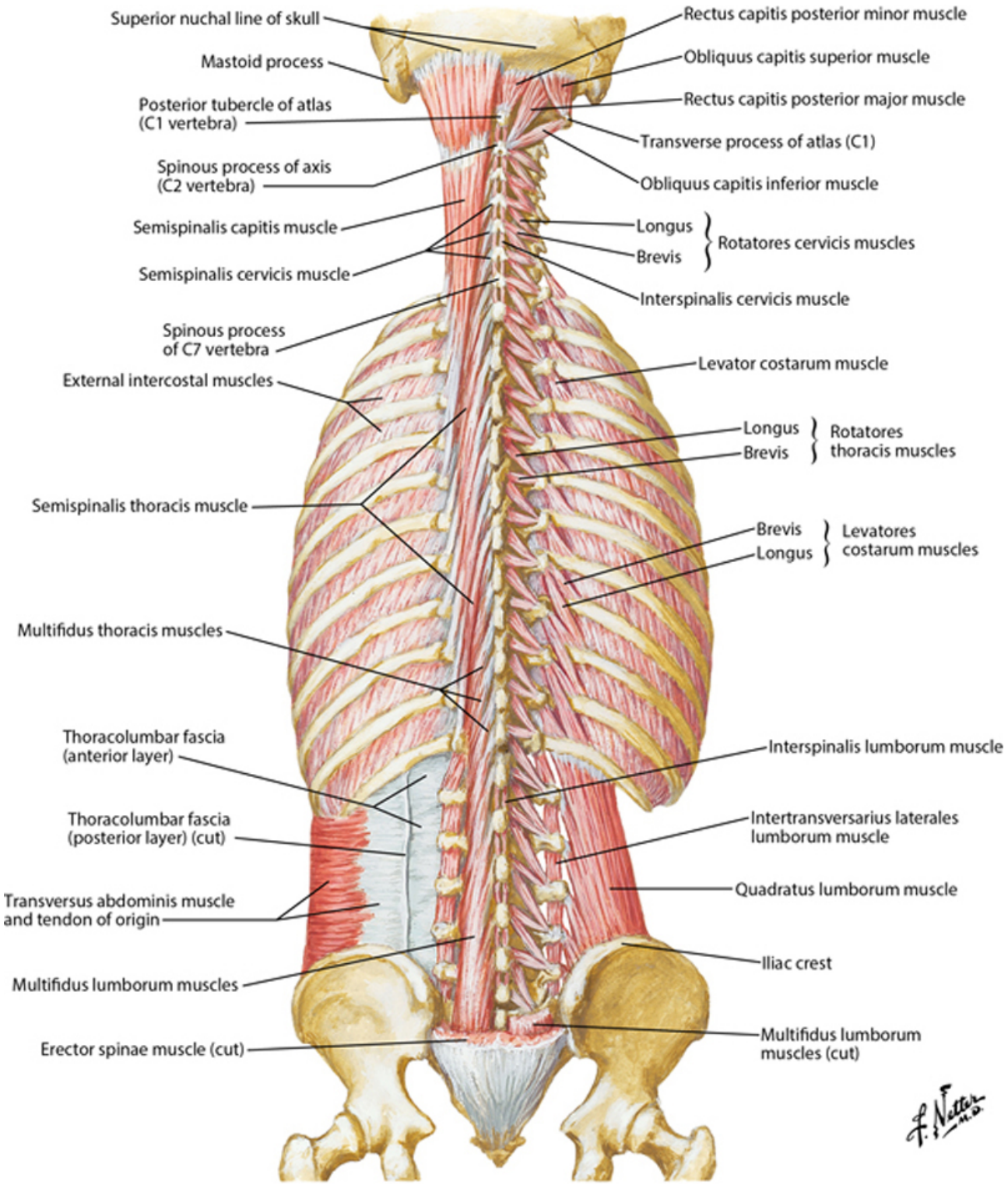
1. Use a scalpel to make a skin incision in the midline of the lumbar region and reflect the skin laterally.
2. Identify and clean the **latissimus dorsi muscle**. Reflect the latissimus dorsi laterally by cutting it from the **thoracolumbar fascia**.
3. Deep to the latissimus dorsi is the **serratus posterior inferior muscle**. Cut the medial attachment of the serratus posterior inferior along the spinout processes and reflect the muscle laterally.
4. Cut the posterior surface of the thoracolumbar fascia beginning in the lower thoracic region and extending to S3. Observe how this fascia is very thin in the thoracic region and becomes very thick at lumbar and sacral levels. Separate and reflect the thoracolumbar fascia from the posterior surface of the **erector spinae muscles**.
5. Identify the **spinalis muscle**, the most medial column of the erector spinae; the **longissimus muscle**, the intermediate column of the erector spinae muscle; and the **iliocostalis muscle**, the lateral column of the erector spinae muscle. Separate these 3 columns of the erector spinae. Observe how these muscles are fused to each other at the level of the sacrum and ilium and cannot be easily separated.
6. Cut the erector spinae muscles from its inferior attachments and reflect superiorly.
7. Identify the **multifidus muscle** immediately deep to the erector spinae. Observe how the multifidus is very wide and thick over the sacrum and that is narrows in the lumbar region.
8. Clinical application: Consider removing the strong posterior SIJ ligaments and disarticulating the SIJ.

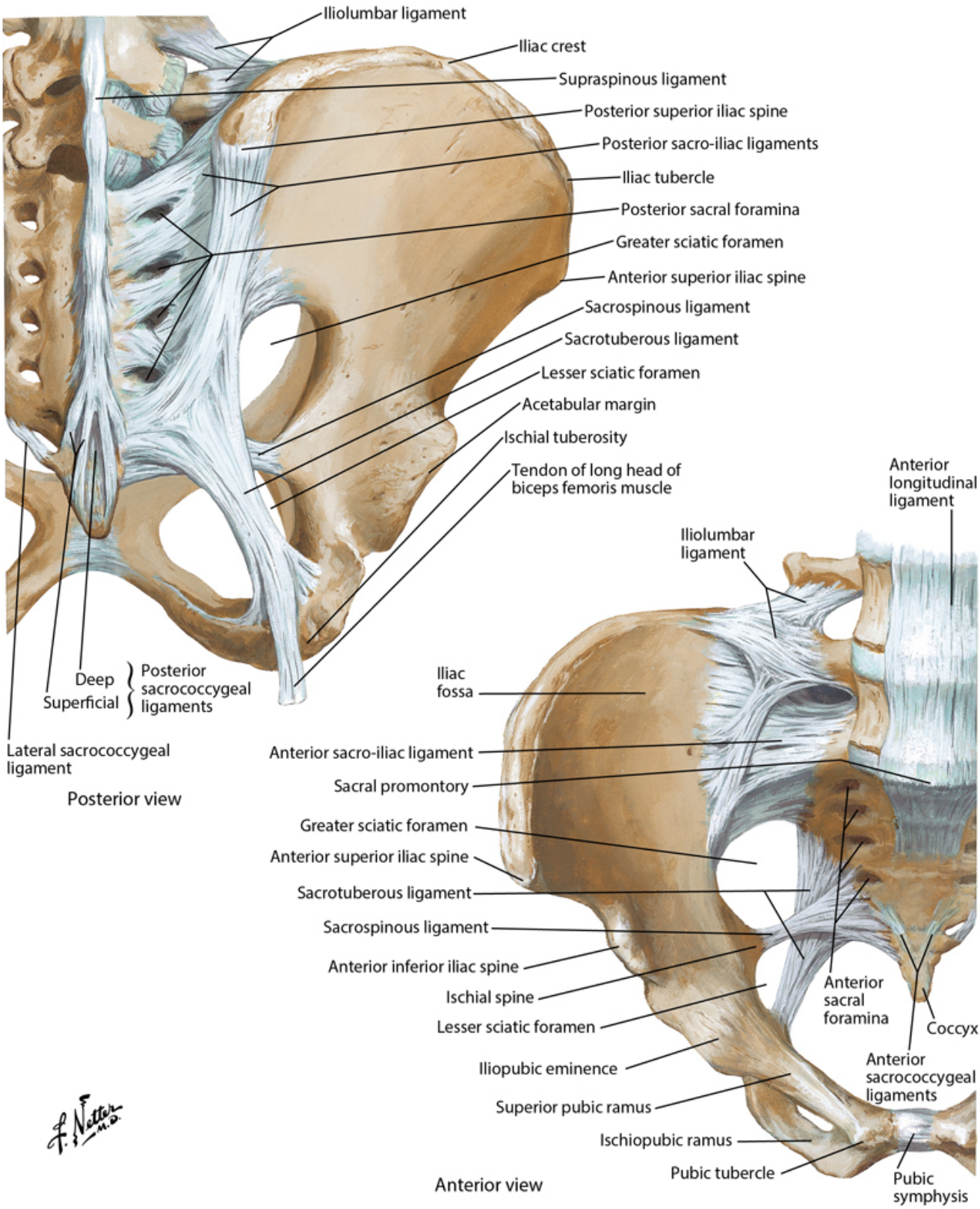






Samford University
School of Health Professions
Department of Physical Therapy





Samford University
School of Health Professions
Department of Physical Therapy

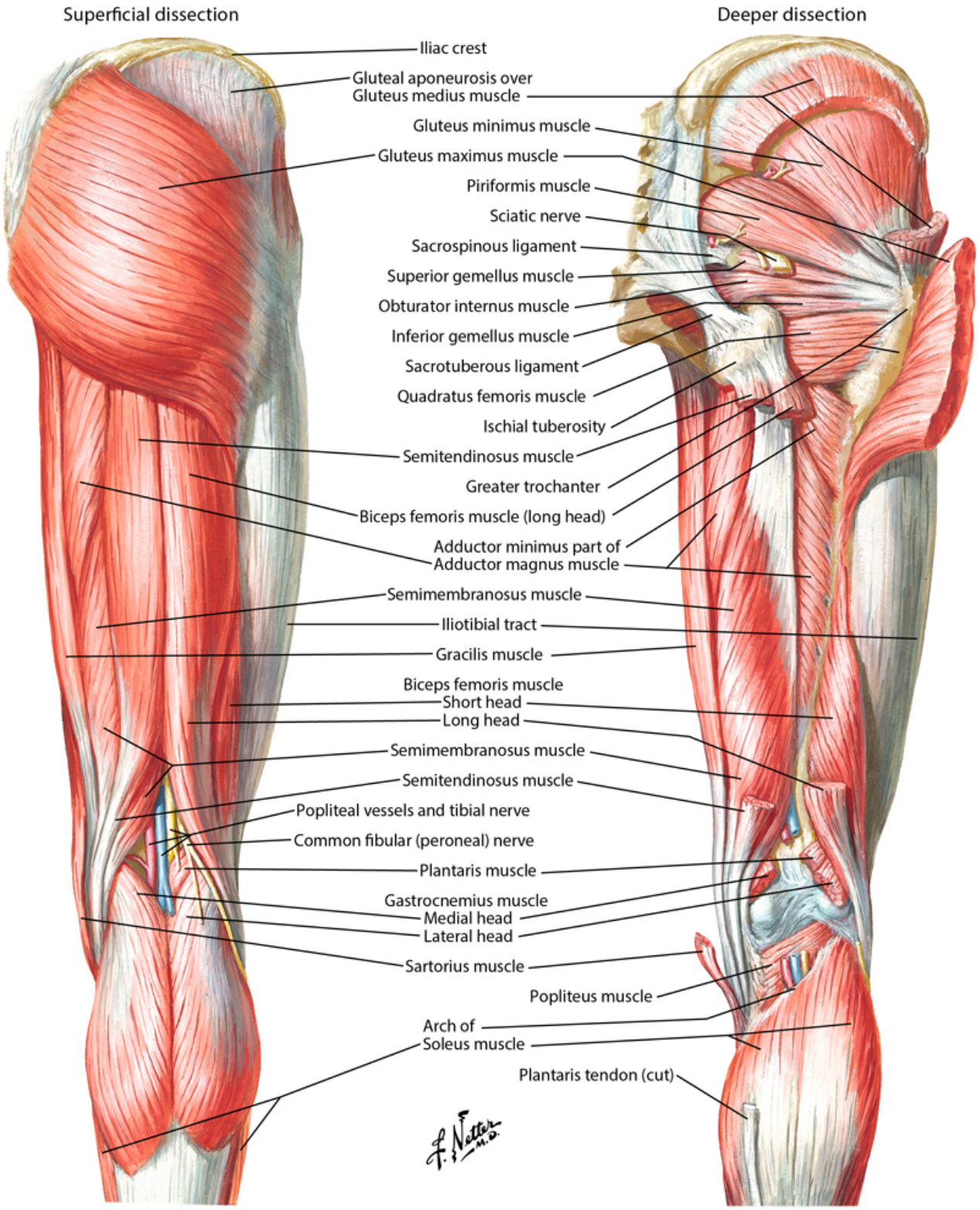
POSTERIOR HIP: Dissection Instructions

Structure List:

Muscles	Nerves	Other Structures
gluteus maximus	inferior gluteal	**sacrotuberous ligament**
gluteus medius	superior gluteal	
piriformis	**sciatic**	
gluteus minimus		
superior gemellus		
obturator internus		
inferior gemellus		
quadratus femoris		

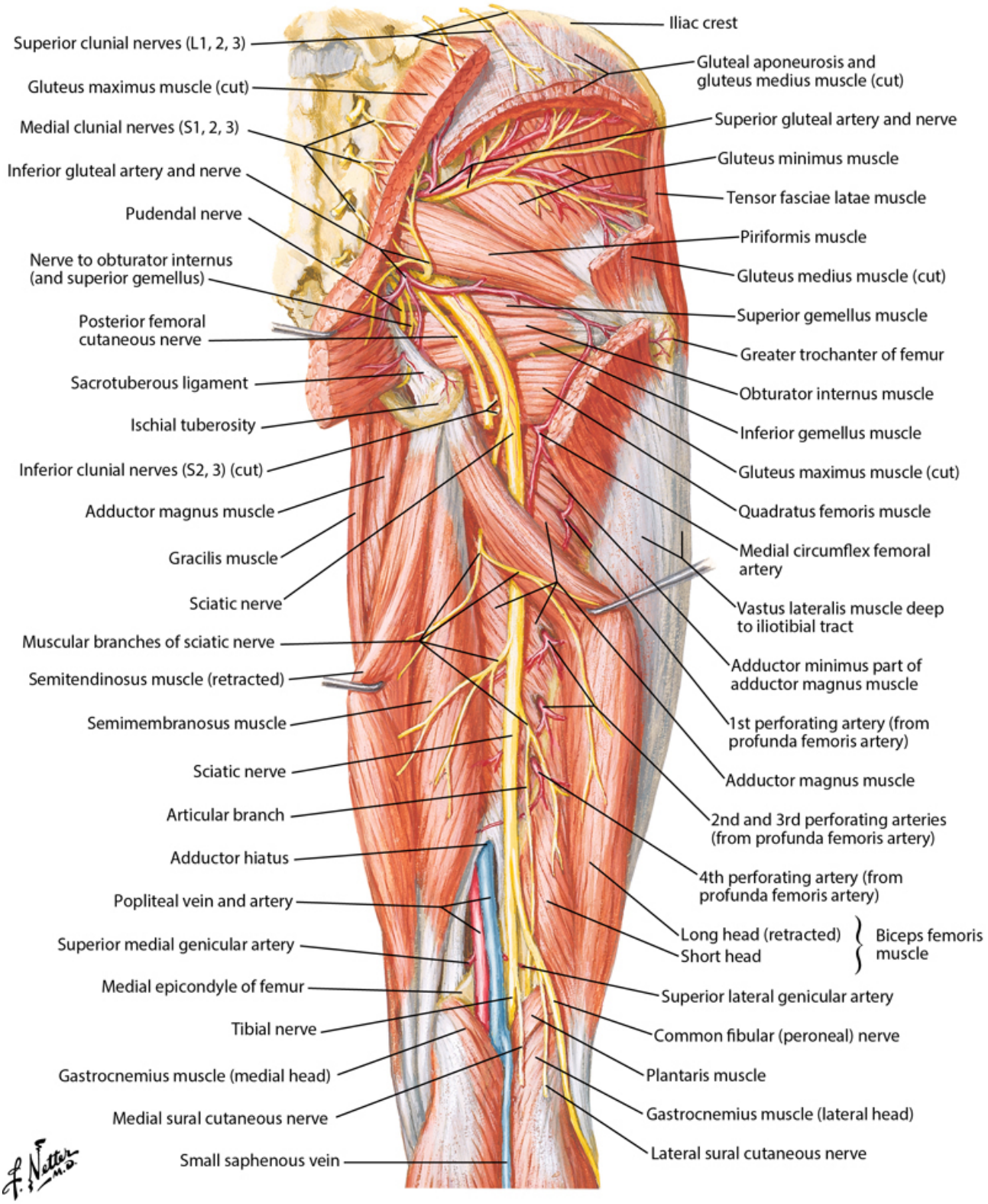
1. Use scalpel to make skin incisions and reflect the skin laterally or remove skin and place in tissue container.
2. Identify and clean the **gluteus maximus muscle**. Observe that the gluteus maximus attaches to the ITB, and through it, the lateral condyle of the tibia. Gluteus maximus also attaches to the gluteal tuberosity of the femur.
3. Near the inferior border of the gluteus maximus, palpate the **sacrotuberous ligament** through the muscular belly of the gluteus maximus. Appreciate the sacrotuberous ligament's orientation.
4. Cut and reflect the gluteus maximus laterally. As you reflect the gluteus maximus, locate the **inferior gluteal nerve**.
5. Identify the **gluteus medius muscle** and define its borders.
6. Inferior and medial to the gluteus medius is the **piriformis muscle**.
7. To identify the **gluteus minimus muscle**, you must reflect the gluteus medius. You can cut through the middle of the gluteus medius and reflect it superiorly and inferiorly.
8. Identify the **superior gluteal nerve** as it supplies the anterior surface of the gluteus medius.
9. Insert your finger in the interval inferior to the piriformis and identify the **superior gemellus muscle**. Observe that the piriformis muscle passes through the greater sciatic foramen nearly filling it, whereas the superior gemellus muscle originates from the ischial spine.
10. Inferior to the piriformis, identify the **sciatic nerve** the largest nerve in the body. In about 12% of the population, the tibial and common fibular divisions emerge from the pelvis separately with the common fibular division passing over the superior border of the piriformis or through the center of the piriformis.
11. Identify the tendon of the **obturator internus muscle** between the gemellus muscles. Observe that the tendon of the obturator internus muscle courses inferior to the superior gemellus and superior to the **inferior gemellus muscle**. The 2 gemellus muscles attach to the obturator internus tendon and might obscure it.
12. Verify that the obturator internus exits the lesser pelvis by passing though the lesser sciatic foramen.
13. Inferior to the inferior gemellus is the **quadratus femoris muscle**.
14. Clinical application: Consider disarticulating the hip joint.

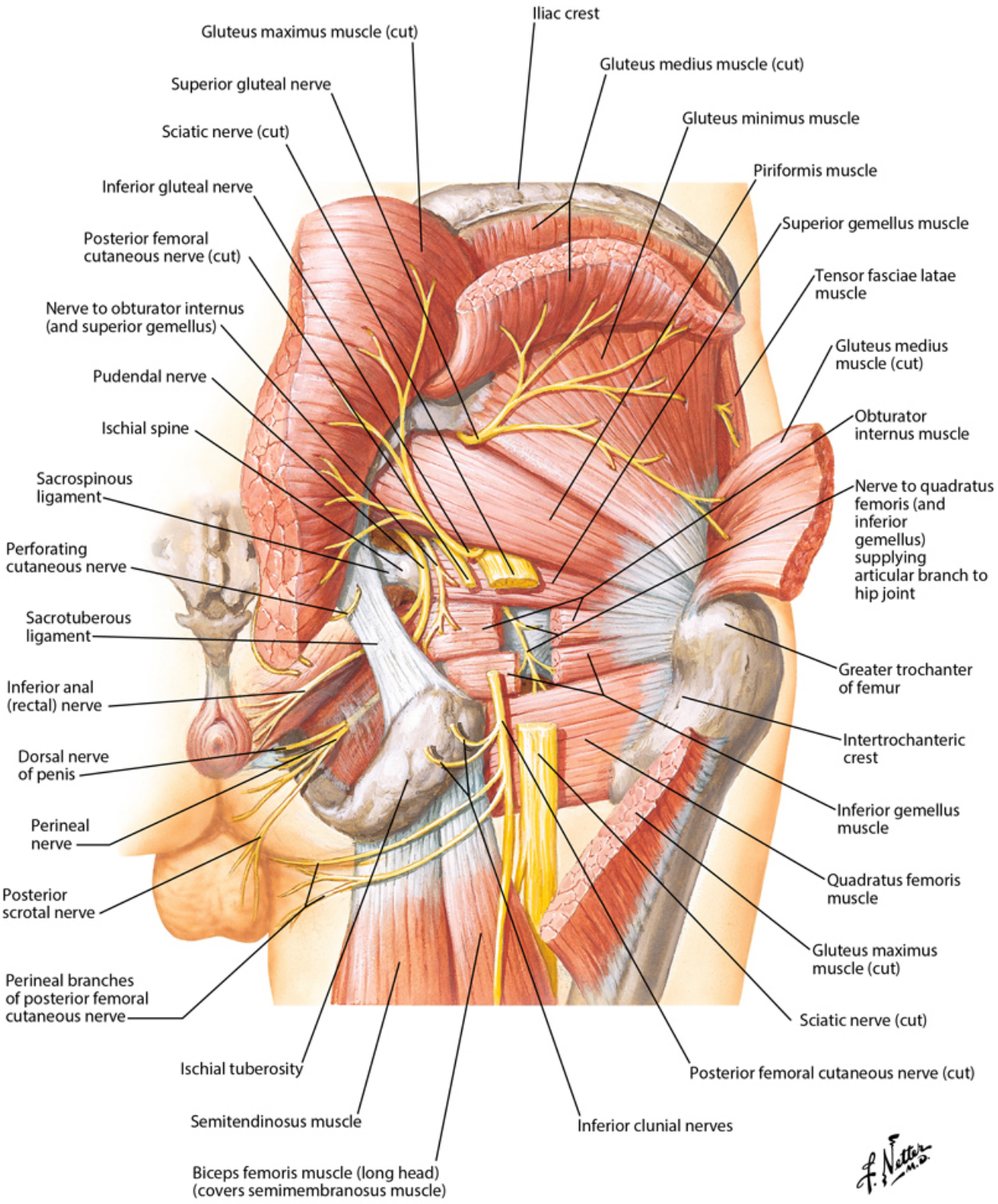
Samford University
School of Health Professions
Department of Physical Therapy

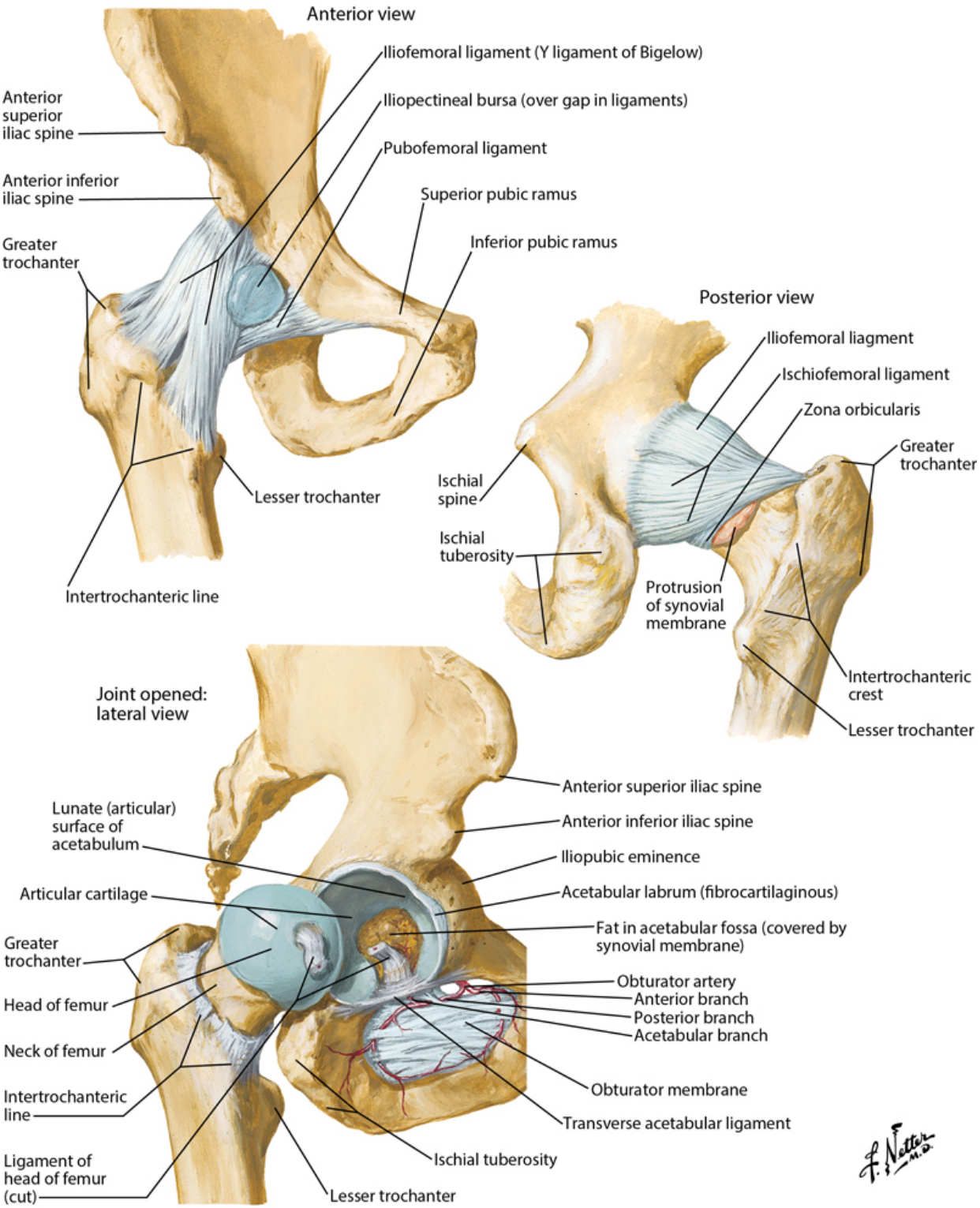


Samford University
School of Health Professions
Department of Physical Therapy

Deep dissection







Samford University
School of Health Professions
Department of Physical Therapy

Grants Dissector was used to create these dissection instructions.

Detton AJ. *Grants Dissector* (16th Edition). Wolters Kluwer: Philadelphia, PA. 2016.

Clinical cases were adopted from https://accessphysiotherapy.mhmedical.com/

A human anatomy atlas was used for the pictures in the dissection instructions.

Netter, FH. *Atlas of Human Anatomy* (6th Edition). Philadelphia, PA: Saunders: 2014.