

International Society of Hair Restoration Surgery

CORE CURRICULUM IN HAIR RESTORATION SURGERY

Revised July 22, 2009

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**1. Basic Science**

1.1. Basic Science of Hair

1.1.1. Scalp Anatomy and Physiology

1.1.1.1. Classic anatomy with emphasis on the scalp and hair

1.1.1.2. Topographical features and underlying bony cranium, musculature and neurovascular anatomy

1.1.1.3. Blood supply of the head and neck

1.1.1.4. Sensory innervation of the head and neck

1.1.1.5. Motor innervation of the head and neck

1.1.1.6. Lymphatic drainage of the head and neck

1.1.1.7. Relaxed skin tension lines of the head and neck

1.1.1.8. Histology/Microscopic anatomy of the skin, scalp, subcutaneous tissues, with specific emphasis on the hair follicle

1.1.1.9. Physiology of the skin and soft tissues

1.1.2. Cyclic Activity of Hair

1.1.3. Androgen-dependent Hair

1.1.4. Pathophysiology of androgenic alopecia

1.1.5. Alopecia: classification and incidence

1.1.5.1. Male

1.1.5.2. Female

1.1.5.3. Age and Degree of Male Pattern Baldness

1.1.6. Types of Hair

1.1.7. Racial and Individual Variations

1.1.8. Hair Loss Etiologies

1.1.8.1. Androgenetic Alopecia and Its Treatment

1.1.8.1.1. Overview

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- 1.1.8.1.1.1. Male vs. Female
- 1.1.8.1.2. History
- 1.1.8.1.3. Biochemistry and Pathogenesis
- 1.1.8.1.4. Medical Treatment of Androgenetic Alopecia
- 1.1.8.1.5. Hair Examination and Investigation
  - 1.1.8.1.5.1. Length of the Hair Cycle – Examination of Hair Roots
  - 1.1.8.1.5.2. Hair Shaft Length and Diameter Measurements
  - 1.1.8.1.5.3. Hair Shaft Morphology – Vellus Hair Index
  - 1.1.8.1.5.4. Hair and Hair Follicle Microscopy
- 1.1.8.2. Cicatricial Alopecias
  - 1.1.8.2.1. Morphea
  - 1.1.8.2.2. LPP
  - 1.1.8.2.3. Scleroderma
- 1.1.8.3. Alopecia Areata
  - 1.1.8.3.1. Etiology
  - 1.1.8.3.2. Diffuse pattern Alopecia Areata
  - 1.1.8.3.3. Dermatopathology
  - 1.1.8.3.4. Clinical Features
  - 1.1.8.3.5. Progression
  - 1.1.8.3.6. Associated Clinical Changes
  - 1.1.8.3.7. Treatment
  - 1.1.8.3.8. Prognosis

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- 1.1.8.4. Congenital Alopecia
- 1.1.8.5. Circumscribed Alopecia
- 1.1.8.6. Total Alopecia
- 1.1.8.7. Hypotrichosis
- 1.1.8.8. Abnormalities of Hair Shaft
- 1.1.8.9. Traumatic Alopecia
- 1.1.8.10. Disturbances of Hair Cycle: Telogen Effluvium
- 1.1.8.11. Diffuse Alopecia of Endocrine Origin
- 1.1.8.12. Alopecia of Chemical Origin
- 1.1.8.13. Alopecia of nutritional and metabolic Origin
- 1.1.8.14. Chronic Diffuse Alopecia
- 1.1.8.15. Alopecia in Central Nervous System Disorders
- 1.1.9. Excess Hair Growth
  - 1.1.9.1. Hypertrichosis
  - 1.1.9.2. Hirsutism
- 1.1.10. Dermatological Scalp Conditions
  - 1.1.10.1. Pityriasis Capitis
  - 1.1.10.2. Pityriasis Amiantacea
  - 1.1.10.3. Seborrhea
  - 1.1.10.4. Seborrheic Dermatitis
  - 1.1.10.5. Seborrheic Dermatitis of Infancy
  - 1.1.10.6. Psoriasis of the Scalp
  - 1.1.10.7. Tinea Capitis
  - 1.1.10.8. Pruritic Syndromes
  - 1.1.10.9. Lichenification and lichen Simplex
  - 1.1.10.10. Contact Dermatitis
  - 1.1.10.11. Acne Necrotica
  - 1.1.10.12. Follicular Keloidalis Nuchae (Acne Cheloidalis)

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1.1.10.13 Folliculitis Decalvans

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- 1.2. Epidemiology and Demographics of hair loss
  - 1.2.1. Age and AGA in men
  - 1.2.2. Female AGA
  - 1.2.3. Ethnic variation in the characteristics of skin, scalp, and hair
- 1.3. Wound Healing
  - 1.3.1. Basic science
    - 1.3.1.1. Phases of wound healing
    - 1.3.1.2. Tensile strength
    - 1.3.1.3. Theories of epidermal and dermal wound healing
  - 1.3.2. Factors that influence wound healing
    - 1.3.2.1. Environmental
    - 1.3.2.2. Local
    - 1.3.2.3. Systemic
    - 1.3.2.4. Genetic
  - 1.3.3. Anatomic and skin type considerations
  - 1.3.4. Microbiology
    - 1.3.4.1. Normal skin flora
    - 1.3.4.2. Pathogenic organisms
  - 1.3.5. Biomechanics and histology of normal skin and scars
  - 1.3.6. Wound Healing
    - 1.3.6.1. Wound healing in hair restoration surgery
    - 1.3.6.2. Postoperative dressings

**2. Clinical Science**

- 2.1. General Surgical Principles
  - 2.1.1. Sterile technique
    - 2.1.1.1. Surgical site preparation
      - 2.1.1.1.1. Choice of antiseptic solution

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- 2.1.1.1.2. Skin prep technique
- 2.1.1.2. Staff preparation
  - 2.1.1.2.1. Hand washing/surgical scrubbing
  - 2.1.1.2.2. Gowning and gloving
- 2.1.1.3. Surgical site draping
- 2.1.2. Instrumentation
- 2.1.3. Instrument preparation
  - 2.1.3.1. Instrument handling and sterility
  - 2.1.3.2. Theory of sterilization
  - 2.1.3.3. Methods of sterilization
  - 2.1.3.4. Resources necessary for sterilization
- 2.1.4. Closure materials
- 2.1.5. Wound care
- 2.2. Patient Consultation, Evaluation, and Preparation
  - 2.2.1. Psychology of Hair
    - 2.2.1.1. Body Image
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    - 2.2.1.3. Beards
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    - 2.2.1.5. Eyebrows
    - 2.2.1.6. Eyelashes
  - 2.2.2. Patient evaluation
    - 2.2.2.1. Appropriate surgical preoperative physical examination
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    - 2.2.2.3. Medications
      - 2.2.2.3.1. Anticoagulants
      - 2.2.2.3.2. Drug interactions

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- 2.2.2.4. Past medical history/Review of systems
  - 2.2.2.4.1. Diabetes
  - 2.2.2.4.2. Heart disease
  - 2.2.2.4.3. Bleeding disorders
  - 2.2.2.4.4. Immunosuppression
- 2.2.2.5. Need for antibiotic prophylaxis
- 2.2.2.6. Alcohol and tobacco use
- 2.2.2.7. Social history
- 2.2.2.8. Hair loss etiologies
  - 2.2.2.8.1. Anatomic considerations
  - 2.2.2.8.2. Appropriate diagnostic studies
- 2.2.3. Selection
  - 2.2.3.1. Realistic expectations
  - 2.2.3.2. Motivation for HRS
  - 2.2.3.3. Classification and treatment options
  - 2.2.3.4. Hair characteristics
  - 2.2.3.5. Special considerations in the younger patient
  - 2.2.3.6. Risk Benefit ratios
    - 2.2.3.6.1. General
    - 2.2.3.6.2. Patient Specific
- 2.2.4. Standardized photography for hair restoration
- 2.2.5. Medicolegal issues in hair replacement
  - 2.2.5.1. Physician Responsibilities
  - 2.2.5.2. Patient education
  - 2.2.5.3. The Process of informed consent
- 2.2.6. Hair Transplantation
  - 2.2.6.1. History
    - 2.2.6.1.1. Hair transplant

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- 2.2.6.1.2. Scalp reduction
- 2.2.6.1.3. Scalp flaps
- 2.2.6.1.4. Scalp expanders
- 2.2.6.1.5. Scalp extenders
- 2.2.6.2. Instrumentation
- 2.2.6.3. Operating Room Setup
- 2.2.6.4. Staffing
- 2.2.6.5. Donor site evaluation
- 2.2.6.6. Terminology of graft sizes
  - 2.2.6.6.1. Round punch graft
  - 2.2.6.6.2. Mini graft
  - 2.2.6.6.3. Micro-graft
  - 2.2.6.6.4. Single hair graft
  - 2.2.6.6.5. Follicular unit graft
  - 2.2.6.6.6. Multi-follicular unit graft
    - 2.2.6.6.6.1. FUs
    - 2.2.6.6.6.2. Non FUs
- 2.2.6.7. Graft Dissection techniques
  - 2.2.6.7.1. Punch grafting
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    - 2.2.6.7.2.3. Slivering
  - 2.2.6.7.3. Multibladed knife
  - 2.2.6.7.4. Follicular unit extraction
- 2.2.6.8. Hairline design
- 2.2.6.9. Recipient site considerations
  - 2.2.6.9.1. Angle of incision

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- 2.2.6.9.2. Orientation of incision
- 2.2.6.10. Graft placement
- 2.2.6.11. Postoperative Care
- 2.2.6.12. Complications
- 2.2.6.13. Repairs
- 2.2.7. Hairline design details
  - 2.2.7.1. Density gradient
  - 2.2.7.2. Principles of hairline placement
    - 2.2.7.2.1. Facial Balance & structural
    - 2.2.7.2.2. Ethnic considerations
    - 2.2.7.2.3. Gender considerations
    - 2.2.7.2.4. Realistic expectations

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- 2.2.7.3. Planning for future hair loss
- 2.2.8. The Donor Site
  - 2.2.8.1. Evaluation
  - 2.2.8.2. Density
  - 2.2.8.3. Tissue Turgidity
  - 2.2.8.4. Scar Management
  - 2.2.8.5. Donor Closure
  - 2.2.8.6. Trichophytic donor closure
  - 2.2.8.7. Accurate estimation of graft requirements when using multibladed knives
  - 2.2.8.8. Elliptical donor harvesting
  - 2.2.8.9. Graft survival
- 2.2.9. Graft Preparation Techniques
  - 2.2.9.1. Graft classification (Micro, mini, FU)
  - 2.2.9.2. Ellipse harvest
  - 2.2.9.3. Multibladed knife
  - 2.2.9.4. Punch grafts
  - 2.2.9.5. Impulse force
  - 2.2.9.6. Use of microscopes
  - 2.2.9.7. Cooling Grafts
  - 2.2.9.8. Storage Solutions
- 2.2.10. Graft Insertion Techniques: Manual/Implanter Devices
  - 2.2.10.1. Parallel Slits
  - 2.2.10.2. Perpendicular slits
  - 2.2.10.3. Manual insertion techniques
  - 2.2.10.4. Implanter devices
- 2.2.11. Postoperative Care
- 2.2.12. Scalp Reductions and Scalp-Lifting

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- 2.2.12.1. Basic Principals of Flap Anatomy and Physiology
  - 2.2.12.1.1. Axial vs. Random Flaps
  - 2.2.12.1.2. Delays
  - 2.2.12.1.3. Advancement vs. Pedicle Flaps
  - 2.2.12.1.4. Suturing limitations
  - 2.2.12.1.5. Tip management
- 2.2.12.2. Planning and Dynamics
- 2.2.12.3. Anesthesia
- 2.2.12.4. Scalp Reductions
  - 2.2.12.4.1. Multiple patterns of scalp reductions
  - 2.2.12.4.2. Scalp extenders to facilitate reduction procedures
  - 2.2.12.4.3. Slot formation, prevention and management
  - 2.2.12.4.4. Slot Correction by a Three-Hair-Bearing Flaps Transposition Procedure in Combination with Scalp Reduction
- 2.2.12.5. Intraoperative tissue expansion
  - 2.2.12.5.1. Tension clamps
  - 2.2.12.5.2. PATE (prolonged acute tissue expansion)
- 2.2.12.6. Scalp Lifting for Major Reductions
- 2.2.12.7. Tissue Expansion biological considerations
  - 2.2.12.7.1. Biological Creep in Tissue Expansion
  - 2.2.12.7.2. Mechanical Creep in Tissue Expansion
  - 2.2.12.7.3. Expanded Scalp Flap Techniques

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- 2.2.12.8. Rotation Scalp Flaps
- 2.2.12.9. Managing Complications of Scalp Reductions and Scalp Lifts
- 2.2.13. Pedicle rotation flaps in the surgical treatment of alopecia
  - 2.2.13.1. Temporoparieto-Occipital Flaps
  - 2.2.13.2. Flap delay
    - 2.2.13.2.1. Physiology
    - 2.2.13.2.2. Technique

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- 2.3. Development of treatment plan
  - 2.3.1. Patient expectations
  - 2.3.2. Surgical feasibility
    - 2.3.2.1. Extent of baldness
    - 2.3.2.2. Donor tissue available
    - 2.3.2.3. Scalp reduction, lift, expansion, extension
  - 2.3.3. Assessments of risks/benefits of treatment plan
  - 2.3.4. Informed consent to include alternative therapies
- 2.4. Anesthesia
  - 2.4.1. ASA risk classification
  - 2.4.2. Topical
  - 2.4.3. Local
  - 2.4.4. Regional
  - 2.4.5. Nerve block anesthesia of the scalp
  - 2.4.6. Special Considerations
    - 2.4.6.1. Monitoring
    - 2.4.6.2. Preoperative anxiolytics
    - 2.4.6.3. Conscious sedation
    - 2.4.6.4. General anesthesia
  - 2.4.7. Complications
  - 2.4.8. Pain control and management of the postoperative period
- 2.5. Emergency Preparedness
  - 2.5.1. Management of surgical emergencies
    - 2.5.1.1. Office emergency equipment
    - 2.5.1.2. Staff/physician preparedness
    - 2.5.1.3. Management of office and surgical emergencies including but not limited to:
      - 2.5.1.3.1. Syncope

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- 2.5.1.3.2. Convulsions
- 2.5.1.3.3. Hemorrhage
- 2.5.1.3.4. Anesthetic toxicity
- 2.5.1.3.5. Allergic reactions
- 2.5.1.3.6. Anaphylaxis
- 2.5.1.3.7. Myocardial infarction
- 2.5.1.3.8. Cardiac arrest
- 2.5.2. Basic and Advanced Cardiac Life Support (ACLS Curriculum)
- 2.5.3. Emergency situations in hair transplantation
  - 2.5.3.1. ACLS
  - 2.5.3.2. Drug toxicity
  - 2.5.3.3. Drug Interactions
    - 2.5.3.3.1. Non Selective Beta Blocker
    - 2.5.3.3.2. Viagra
  - 2.5.3.4. Anaphylaxis
    - 2.5.3.4.1. Distributive Hypovolemia
    - 2.5.3.4.2. Treatment
      - 2.5.3.4.2.1. Volume expansion
      - 2.5.3.4.2.2. Steroids
      - 2.5.3.4.2.3. Antihistamines
      - 2.5.3.4.2.4. Support
  - 2.5.3.5. Drug overdose
  - 2.5.3.6. Monitoring
  - 2.5.3.7. Resuscitation equipment
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      - 2.5.3.7.2.1. LMA's

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2.5.3.7.2.2. Oral airway

2.5.3.7.2.3. Endotracheal intubation

2.5.3.7.3. IV Access techniques

2.5.3.8. Bleeding complications

2.5.3.8.1. Von Willebrand's disease

2.5.3.8.2. Aspirin

2.5.3.8.3. Coumadin

2.5.3.8.4. Clopidogrel

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2.6. Reconstruction

2.6.1. Surgical techniques

2.6.1.1. A traumatic tissue handling

2.6.1.2. Hemostasis

2.6.1.3. Suture technique

2.6.1.4. Dressing

2.6.1.5. Wound management

2.6.2. Surgical options

2.6.2.1. Hair transplant

2.6.2.2. Scalp reduction

2.6.2.3. Scalp flaps

2.6.2.4. Scalp extension

2.6.2.5. Scalp lifting

2.6.2.6. Second intention healing

2.6.2.7. Split thickness skin grafts

2.6.2.8. Full thickness skin grafts

2.6.2.9. Artificial skin and allograft, xenograft

2.7. Complications

2.7.1. General theory, management, and prevention of complications:

2.7.1.1. Tissue necrosis

2.7.1.2. Bleeding, hematoma

2.7.1.3. Infection

2.7.1.4. Wound dehiscence

2.7.1.5. Postoperative patient education regarding possible complications, wound care, activity level and need for surgical revision

2.7.1.6. Management of chronic or non-healing wounds

2.7.1.7. Deep Vein Thrombosis

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- 2.7.2. Complications of Hair Transplantation
  - 2.7.2.1. Scarring and keloid formation
  - 2.7.2.2. Inadequate growth
  - 2.7.2.3. Poor graft preparation
  - 2.7.2.4. Graft dessication
  - 2.7.2.5. Post Op Bleeding
  - 2.7.2.6. Mushy dermis and donor harvest
  - 2.7.2.7. Post-transplant epidermoid cysts/ folliculitis
  - 2.7.2.8. Arteriovenous malformation
  - 2.7.2.9. Dissatisfied Patients
- 2.7.3. Complications of Flaps in the Treatment of Baldness
  - 2.7.3.1. Violations of the axial blood supply leading to necrosis
  - 2.7.3.2. Abnormal hair direction
  - 2.7.3.3. Aesthetic problems with poor execution
  - 2.7.3.4. Long-term problems after hair bearing flap transpositions for male pattern baldness
- 2.7.4. Scar revision
  - 2.7.4.1. Principles of wound healing
    - 2.7.4.1.1. Scar formation
      - 2.7.4.1.1.1. Normal
      - 2.7.4.1.1.2. Hypertrophic
      - 2.7.4.1.1.3. Keloid
  - 2.7.4.2. Recognition and management of suboptimal scar
    - 2.7.4.2.1. Hypertrophy
    - 2.7.4.2.2. Keloid
    - 2.7.4.2.3. Dyschromia
    - 2.7.4.2.4. Erythema
    - 2.7.4.2.5. Wound contracture

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2.7.4.2.6. Other

2.7.4.3. Principles of scar revision

2.7.4.3.1. Elongation and reorientation

2.7.4.3.1.1. Z-plasty

2.7.4.3.1.2. W-plasty

2.7.4.3.1.3. Geometric

2.7.4.3.2. Tissue expansion

2.7.4.3.3. Resurfacing

2.7.4.3.3.1. Dermabrasion

2.7.4.3.3.2. Shave abrasion

2.7.4.3.3.3. Skin graft

2.7.4.3.3.4. Laser

2.7.4.3.4. Non-surgical approaches

2.7.4.3.4.1. Intralesional and topical steroids

2.7.4.3.4.2. Silicone gel sheeting

2.7.4.3.4.3. Massage

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- 2.8. Strategies in updating old techniques and correcting suboptimal results
- 2.9. Interdisciplinary Care of Patient
  - 2.9.1. Interdisciplinary care for complicated cases
  - 2.9.2. Interaction with other medical and surgical specialists to provide optimal care
  - 2.9.3. Education of other medical, surgical, and lay specialists in HRS
  - 2.9.4. Non-surgical Hair Replacement
- 2.10. Medical Therapy
  - 2.10.1. Current understanding of AGA and testosterone
  - 2.10.2. Minoxidil
  - 2.10.3. Finasteride
  - 2.10.4. Dutasteride
  - 2.10.5. Low level light therapy
  - 2.10.6. OTC & other treatments
- 2.11. Special Considerations
  - 2.11.1. Hair Transplantation in Blacks
  - 2.11.2. Hair Transplantation in Asians
  - 2.11.3. Hair Transplantation in Females
  - 2.11.4. Hair transplantation of the eyebrows
  - 2.11.5. Hair transplantation of the eyelashes
  - 2.11.6. Reconstruction of the Temporal Points Area
  - 2.11.7. Moustache Transplantation
  - 2.11.8. Hair Transplantation in Skin Grafts, Thin Recipient Skin, and Radiation induced Alopecia
  - 2.11.9. Treatment of the genetically male transsexual
    - 2.11.9.1. Hair transplantation
    - 2.11.9.2. Scalp expansion

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- 2.11.9.3. Scalp flaps
- 2.11.10. The treatment of female pattern alopecia
- 2.11.11. Synthetic hair
- 2.11.12. Automation techniques in HRS
- 2.11.13. Scalp Reconstruction Techniques
  - 2.11.13.1. Surgical Treatment of the Avulsed Scalp
  - 2.11.13.2. Management of the Tunnel Graft for hair piece retention
- 2.11.14. Ethics, Marketing & Patient consent
  - 2.11.14.1. The relationship between the patient and physician
  - 2.11.14.2. The patient's responsibilities
  - 2.11.14.3. The physician's responsibilities

**3. Professional/Regulatory Topics**

- 3.1. Medical-legal Issues
  - 3.1.1. Risk assessment in the surgical patient
    - 3.1.1.1. Preoperative
    - 3.1.1.2. Intraoperative
    - 3.1.1.3. Postoperative
    - 3.1.1.4. Medical complications/contraindications for surgery
  - 3.1.2. Medical record documentation
    - 3.1.2.1. Written patient questionnaires
    - 3.1.2.2. Preoperative evaluation
    - 3.1.2.3. Operative report
    - 3.1.2.4. Postoperative instruction
    - 3.1.2.5. Documentation of telephone calls for appointments/advice/prescriptions

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- 3.1.3. Quality assurance (QA) and continuous quality improvement (CQI)
  - 3.1.3.1. Understanding of concepts of QA and CQI
  - 3.1.3.2. Participation in QA and CQI project
- 3.1.4. Informed consent
  - 3.1.4.1. Concept of informed consent
    - 3.1.4.1.1. Expressed of implied
    - 3.1.4.1.2. Written versus verbal
    - 3.1.4.1.3. Who may provide consent
    - 3.1.4.1.4. Medical record documentation
  - 3.1.4.2. Elements of informed consent
    - 3.1.4.2.1. Problem to be treated
    - 3.1.4.2.2. Proposed test or treatment
    - 3.1.4.2.3. Indications for test or treatment choice
    - 3.1.4.2.4. Expected results or goals of test or treatment
    - 3.1.4.2.5. Disclosure of risks, complications and side effects
    - 3.1.4.2.6. Reasonable alternative methods of diagnosis or treatment
    - 3.1.4.2.7. Consequences of no treatment or delayed treatment
    - 3.1.4.2.8. Documentation of informed consent

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- 3.1.4.3. Medical and surgical standard of care
- 3.1.5. Photographic Reproduction
  - 3.1.5.1. Photographic informed consent
  - 3.1.5.2. Use of images (e.g., medical records/publication/presentation)
  - 3.1.5.3. Patient's right to privacy
- 3.2. Regulatory Issues
  - 3.2.1. U.S. Occupational Safety and Health Administration (OSHA) standards
    - 3.2.1.1. OSHA regulations as they relate to HRS
      - 3.2.1.1.1. Federal, state and local compliance requirements
      - 3.2.1.1.2. Hazard determination and safety procedures
      - 3.2.1.1.3. Hazard chemical inventory including material safety data sheets (MSDS)
    - 3.2.1.2. Monitoring/updating program
      - 3.2.1.2.1. Log of hazard communication program
      - 3.2.1.2.2. Inventory update log
      - 3.2.1.2.3. MSDS update log
      - 3.2.1.2.4. MSDS request log
    - 3.2.1.3. Special labeling requirements
    - 3.2.1.4. Preparation for inspection
  - 3.2.2. Blood borne pathogens (BBP)
    - 3.2.2.1. OSHA regulations regarding BBP
    - 3.2.2.2. Epidemiology, mode of transmission and symptoms of BBP
    - 3.2.2.3. Universal precautions
    - 3.2.2.4. Exposure control plan for HRS
      - 3.2.2.4.1. Reduction of exposure to BBP

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3.2.2.4.2. Personal protective equipment

3.2.2.4.3. Post-exposure management plan for BBP

3.3. Professional Ethics

3.3.1. Professional ethical standards

3.3.1.1. Doctor/patient relationship

3.3.1.2. Physician interactions

3.3.1.3. Medical ethics

3.3.1.4. Business ethics

3.3.1.5. Other

3.3.2. Selection of the most cost-effective treatment plan given patient goals

3.3.3. Realistic expectations

3.3.4. Professional Marketing

3.3.4.1 Fidelity

3.3.4.2 Patient Autonomy

Apply Consultation & Patient Education Ethical Standards