First identified in 1935, canine hip dysplasia is thought to be the most common orthopedic condition diagnosed in the dog. It is most prevalent in large and giant breed dogs, with a complex polygenic mode of inheritance, and relatively low heritability. External factors including caloric intake when growing have a significant effect on phenotypic expression. Initial joint laxity progresses to osteoarthritis due to subluxation and abnormal wear. Selective breeding programs to attempt to decrease prevalence have shown modest results so far.

Hind dysplasia is a common developmental disorder of the dog, consisting of varying degrees of hip laxity, progressive remodeling of the structures of the hip, and subsequent development of osteoarthritis. It is a juvenile-onset condition, with clinical signs often first evident at 4 to 12 months of age. A tentative diagnosis of hip dysplasia can be made based on signalment, history, and physical examination findings. The Ortolani test is a valuable tool for identifying juvenile dogs affected with this condition. Further diagnostics can then be prioritized, contributing to prompt diagnosis and appropriate treatment.

Diagnostic imaging is the principal method used to screen for and diagnose hip dysplasia in the canine patient. Multiple techniques are available, each having advantages, disadvantages, and limitations. Hip-extended radiography is the most used method and is best used as a screening tool and for assessment for osteoarthritis. Distraction radiographic methods such as the PennHip method allow for improved detection of laxity and improved ability to predict future osteoarthritis development. More advanced techniques such as MRI, although expensive and not widely available, may improve patient screening and allow for improved assessment of cartilage health.

Canine hip dysplasia (CHD) is a complex, polygenic disease radiographically associated with hip subluxation and development of osteoarthritis. Screening
programs have been established with the goal of hip improvement, with the most common in the United States being OFA hip scoring and the PennHIP method. When evaluating the single hip-extended view used by OFA versus the 3 radiographic views and associated distraction index (DI) used by PennHIP for CHD screening, the scientific evidence supports the use of the DI and PennHIP method. OFA scoring can be used to effect hip improvement, especially when incorporated into estimated breeding values.

Conservative Management of Hip Dysplasia 807
Tisha A.M. Harper

Hip dysplasia (HD) is a common orthopedic condition seen in small animal patients that leads to osteoarthritis of the coxofemoral joint. The disease can be managed conservatively or surgically. The goals of surgical treatment in the immature patient are to either prevent the clinical signs of HD or to prevent or slow the progression of osteoarthritis. In mature patients surgery is used as a salvage procedure to treat debilitating osteoarthritis. Conservative management can be used in dogs with mild or intermittent clinical signs and includes nutritional management and weight control, exercise modification, physical rehabilitation, pain management and disease-modifying agents.

Physical Rehabilitation for the Management of Canine Hip Dysplasia 823
David L. Dycus, David Levine, and Denis J. Marcellin-Little

Hip dysplasia is among the most common orthopedic conditions affecting dogs. Joint laxity is responsible for abnormal development of the femoral head and acetabulum, leading to excessive wear of the articular cartilage. Wear leads to secondary osteoarthritis. Rehabilitation is either conservative or after surgical management. Conservative rehabilitation therapies are directed at decreasing pain, improving hip range of motion (ROM), and building or maintaining muscle mass. Postoperatively, rehabilitation focuses on decreasing postoperative pain and inflammation, improving comfort and limb use, and protecting the surgical site. Once the patient has healed, rehabilitation is directed at improving ROM and promoting muscle mass.

Juvenile Pubic Symphysiodesis 851
Kathleen A. Linn

In properly selected dogs, juvenile pubic symphysiodesis improves joint congruity, decreases hip laxity, and can reverse or prevent progression of degenerative joint disease in the hips. To be effective, surgery must be done at a young age and in hips that are only mildly to moderately lax. Juvenile pubic symphysiodesis is best viewed more as a preemptive procedure than as a strictly therapeutic one. Dogs considered to be at risk for hip dysplasia should be screened with Ortolani testing at 12 weeks of age, with further imaging and perhaps surgery to follow for those who have a positive Ortolani sign.

Triple Pelvic Osteotomy and Double Pelvic Osteotomy 865
Francisco Guevara and Samuel P. Franklin

Triple and double pelvic osteotomy (TPO, DPO) are performed with the goal of increasing acetabular ventro-version, increasing femoral head coverage,
and decreasing femoral head subluxation. Since the first descriptions of TPO, there have been modifications in technique, most notably omission of the ischial osteotomy for DPO, and improvements in the implants, including availability of locking TPO/DPO bone plates. Associated complication rates seem to have declined accordingly. The most salient questions regarding these procedures remain what selection criteria should be used to identify candidates and whether halting or preventing osteoarthritis is necessary to consider these surgeries clinically beneficial.

**Femoral Head and Neck Excision**

Tisha A.M. Harper

Femoral head and neck excision is a surgical procedure that is commonly performed in small animal patients. It is a salvage procedure that is done to relieve pain in the coxofemoral joint and restore acceptable function of the limb. Femoral head and neck excision is most commonly used to treat severe osteoarthritis in the coxofemoral joint and can be done in dogs and cats of any size or age. The procedure should not be overused and ideally should not be done when the integrity of the coxofemoral joint can be restored.

**BioMedtrix Total Hip Replacement Systems: An Overview**

Teresa D. Schiller

Total hip replacement for canine and feline patients affected by degenerative, traumatic, and vascular injury of the coxofemoral joint has become a highly successful orthopedic procedure. The highly effective BioMedtrix total hip replacement systems use cemented and cementless implants with unique design features to address a variety of bone conditions and surgeon expertise and preferences. There are pros and cons for both systems with common and unique complications that can occur in either system. Surgeon experience and adherence to the principles of technique will strongly influence the complication rate and outcomes.

**Zurich Cementless Total Hip Replacement**

David Hummel

Total hip replacement (THR) is the gold standard treatment of intractable pain from hip dysplasia. THR procedures are divided into 2 main categories: cemented and cementless, with hybrid a combination. The Zurich Cementless THR system uses a combination of press-fit (acetabular component) and locking screw (femoral component) fixation designed to address the main challenge facing cemented systems (aseptic loosening) while providing the benefit of immediate stability with its novel locking screw implantation system for the femoral stem. The Zurich THR system is an effective treatment option for orthopedic conditions of the coxofemoral joint in medium to giant breed dogs.

**INNOPLANT Total Hip Replacement System**

Tisha A.M. Harper

Total hip replacement is a salvage procedure that is done to alleviate discomfort secondary to osteoarthritis in the hip, which is most often a
result of hip dysplasia. Commercially available total hip replacement implants for small animal patients are classified as cemented or cementless. The INNOPLANT Total Hip Replacement system includes modular, screw-in cementless components that were developed to improve implant stability by maintaining as much normal anatomic structure, and by extension biomechanics of the coxofemoral joint, as possible. As a newer system, there are few data and no long-term studies available in the veterinary literature.