



San Carlos Veterinary Hospital (SCVH)
8618 Lake Murray Blvd.
San Diego, CA 92119
(619) 460-3100
www.sancarlosvet.com

- Dr. Dean R. Gahring, D.V.M.; Diplomate, ACVS
 - Dr. Bruce N. Persky, D.V.M.
 - Dr. Stanley P. Kus, M.S., D.V.M.
 - Dr. Laurel Nishida, D.V.M.
- E-mail: info@sancarlosvet.com

Long-term Results with DARthroplasty

By
Dean R. Gahring, DVM,
Diplomate, American College of Veterinary Surgeons
San Carlos Veterinary Hospital
www.sancarlosvet.com

Treatment of canine hip dysplasia has historically included essentially four options: 1) long-term medications, 2) femoral head/neck excision arthroplasty, 3) total hip replacement, and 4) triple pelvic osteotomy (TPO).

In the case of long-term medications, there is always the risk of intestinal upset, drug intolerance, and increasing requirement due to the fact that the degenerative process continually progresses.

Femoral head/neck excision arthroplasty has universally been considered a "salvage procedure" that has led to significant gait abnormalities and limited relief of pain in animals over 20-25 lbs.

Total hip replacement has been a useful "salvage" technique with good results, but cost has always been a major consideration and the procedure has a higher risk factor for both short-term and long-term complications.

Triple pelvic osteotomy has been used both for treatment and in a "preventative" mode for

canine hip dysplasia. Long-term results have shown that TPO performed in dogs with both hip joint laxity and already-present degenerative joint disease (DJD) fail to prevent progression of DJD. This has been my experience as well. I have come to limit the use of TPO's to cases of young dogs with hip joint laxity but essentially no DJD. The acetabulae must be relatively deep and well contoured to the femoral head for an excellent outcome to be expected. Cases with shallow acetabulae and/or poor acetabulum/femoral head congruity are very likely destined to become progressively more arthritic over time after a TPO and many may even require additional treatment or surgery.

A FIFTH option is now available: [DARthroplasty](#) (Dorsal Acetabular Rim arthroplasty) is a technique developed by [Dr. Barclay Slocum and Theresa Devine Slocum](#). Corticocancellous bone strips, taken from the iliac crest, are contoured over the femoral head and sutured to the dorsal hip joint capsule and packed with additional cancellous bone graft dorsally to eventually anchor to drill holes in



the original dorsal acetabulum. The new "shelf" eventually becomes an extension of the original acetabulum, thereby providing support and eliminating subluxation of the hip joint. The joint capsule becomes the new joint surface.



Figure 2: Pre-operative CT scan of shallow hips (DAR view)



Figure 3: Cortico-cancellous strips in place



Figure 4: Mature new Dorsal Acetabular Rim "shelves"



Figure 1: Drawing of DARthroplasty technique

Figures 5,6: Post-mortem specimens with (left) and without (right) soft tissues after standard (2-strip) DARthroplasty

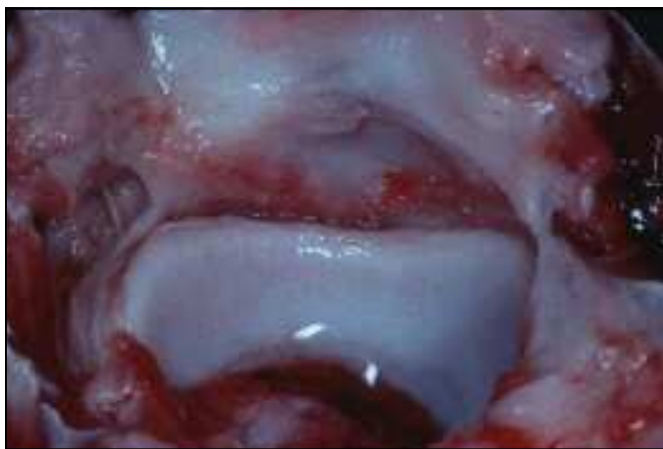


Figure 5:

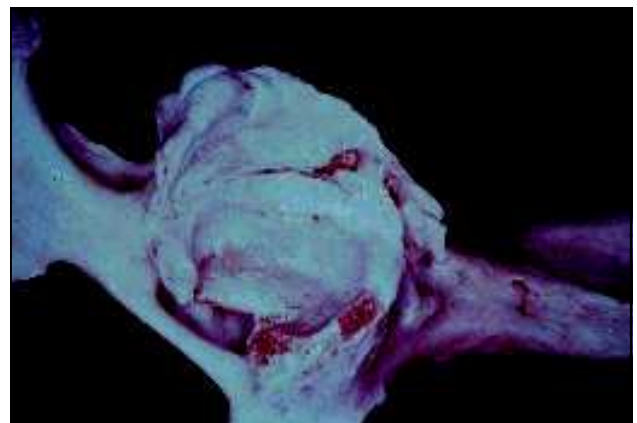


Figure 6:

Continued



We recently evaluated 11 of our first 15 cases of DARthroplasty (four additional cases were lost to follow-up) that had at least a one-year follow-up (some had over three years follow-up). A total of 15 hip joints were evaluated. Our results were both enlightening and very encouraging. Five of the 11 cases were re-presented for >1 year follow-up examinations and radiographs, the other case evaluations were obtained by telephone conversation. One case died a year after the surgery of unknown causes. Four cases only had DARthroplasties done on one hip, four cases had bilateral DARthroplasties done, and three cases had a triple pelvic osteotomy done on one side and a DARthroplasty done on the other. Eight hips had "minor" DARthroplasties (only a single corticocancellous strip) and seven hips had "standard" DARthroplasties (two corticocancellous strips were used).

Breeds of dogs treated were two German shepherds, one mixed breed shepherd, three golden retrievers, one Springer spaniel, one Irish setter, two Pit bull mixed breed dogs, and one mixed breed terrier. The Springer spaniel was a controlled Addisonian and was grossly overweight and two dogs had also had surgeries performed for ruptured cranial cruciate ligaments (one was a Tibial Plateau Leveling Osteotomy and one was an extracapsular repair). One dog had hip dysplasia due to the development of coxa valga from a surgical repair of a femoral fracture. They ranged in age from 9 months to 7 ½ years and the degree of degenerative joint disease varied from mild to severe (most were in the "moderate" category). Because of the marked variation of cases in this study, I broke the cases up into several smaller categories that matched similar types of cases with each other or stood alone as unique cases.

Results, as I said, were both enlightening and encouraging. For the three cases that had TPO's done on one hip and DARthroplasties done on the other hip (the "worse" hip), the results were as follows: All had minor (1-strip) procedures and all 3 DARthroplasty joints had what I classified as moderate DJD (I used a simple categorization of mild, moderate, and severe). In all 3 cases, the DARthroplasty side was considered as good or better result than the TPO side by the owners



Figure 7: Pre-operative sample case



Figure 8: Marked hip laxity



Figure 9: Fourteen months post-operative.

and by me (even though TPO's were done earlier and on hips with less DJD) and all hips remained relatively quiet radiographically long-term. All dogs were very active and were NOT on any anti-inflammatory medications.

Continued



The results of 2 cases of dogs less than 1 year of age that had moderate DJD and bilateral standard (2-strip) DARthroplasties were as follows: Both dogs were doing great and owners were very happy with the results. Neither dog was on any anti-inflammatory medication. These are cases that I

would DEFINITELY NOT consider TPO for because of the moderate degree of DJD. Without the option of DARthroplasty, these were cases that would have eventually been candidates for "salvage" procedures or long-term medications.



Figure 10: Pre-operative subluxated hips



Figure 13: DAR view of DARthroplasties



Figure 11: Pre-operative DAR view



Figure 14: New "shelf" solidifying



Figure 12: Bilateral DARthroplasties



Figure 15: Twenty-eight months post-operative

Continued



The results of 2 mature dogs with moderate DJD that only had one side done with minor DARthroplasties are as follows: Both were doing very well and were very active (only telephone follow-ups). One of the dogs is an overweight Addisonian patient. Neither dog was on any anti-inflammatory medication.

The two cases of 4+ year old dogs with severe DJD were the most surprising and rewarding to me, even though the follow-ups were only by telephone. One dog only had a minor DARthroplasty done on one side, one had both sides operated. Both dogs were considered more active than they were pre-operatively, both were playful, showed no signs of stiffness, but neither jumped much. The long-term evaluations were done by telephone. Neither dog was on anti-inflammatory medications.



Figure 16: Advanced DJD



Figure 17: DAR view of left DARthroplasty



Figure 18: Severe hip subluxation



Figure 19: Nineteen months post-operative



Figure 20: Mature new "shelves" 19 months post-DARthroplasties

Continued



The results of a case of a poorly muscled Irish Setter with severely subluxated hips that had bilateral standard DARthroplasties performed showed that the muscle development in the rear legs was slightly better than it was preoperatively, the dog runs as well as other dogs and pulls its owner on the leash, but still doesn't jump (although it never did). Radiographs 19 months post-operative revealed very minimal progression of DJD. This dog was not on any anti-inflammatory medication.

One dog that had severe right hip dysplasia due to marked coxa valga as the result of an old fracture that was repaired with an IM pin (and also had left ruptured anterior cruciate surgery). Both surgeries were performed elsewhere when the dog was still a puppy. A standard DARthroplasty was performed on the dysplastic hip. He walked the same on both rear legs but there was radiographic evidence of progression of DJD. He walks with a narrow-based gait and occasionally shows a shifting leg lameness. All things considered, the owner was still relatively satisfied with the results of the DARthroplasty, although I would have preferred to do additional reconstructive surgery for the coxa valga.

Assessment

I used a simple grading system (that I would ask the owner to give, along with my own) of Excellent, Good, Fair, Poor. The final tallies are as follows:

Excellent	7/11 = 64%
Good	4/11 = 36%

The coxa valga case was given a "good" grade by the owner but I only gave it a "fair" long-term grade.

DARthroplasty for coxa valga hip dysplasia



Figure 21: Immediate post-operative



Figure 22: Thirty-five months post-operative (ventro-dorsal view)



Figure 23: Thirty-five months post-operative (lateral view)

Continued



Some observations and revelations from this retrospective study include:

1) All but the weak-muscled Irish Setter with the severe subluxations walked with near normal gaits and full or near-normal strength (even the Irish Setter) and almost all had normal muscle masses, 2) the cases I was able to get back for re-examination did not exhibit any obvious stiffness sitting, getting up, or jumping up, 3) NONE of the cases are on anti-inflammatory medications, 4) post-operative recovery was amazingly fast and postoperative morbidity was less than most other orthopedic procedures, 5) even the most severely arthritic cases had surprisingly good results with only the coxa valga case showing radiographic evidence of significant progression of DJD.

Conclusions:

1) DARthroplasty is definitely beneficial in treating canine hip dysplasia, even in cases of marked DJD, 2) DARthroplasty is as good or better than TPO, 3) DARthroplasty is a very effective treatment for canine hip dysplasia in both young and mature dogs with mild to moderate DJD, 4) DARthroplasty seems to have a useful place in treating severely dysplastic hips, 5) long-term radiographic follow-ups (1-3 years) revealed minimal progression of DJD in all but one case re-examined, 6) long-term activity levels, stamina, and strength were surprisingly good in all cases, 7) anti-inflammatory medications did not seem to be needed as additional treatment in our long-term follow-ups, and 8) DARthroplasty offers an excellent alternative to total hip replacement or other "salvage" procedures in many cases.

References

Slocum, B. & Slocum, T.D. DARthroplasty.
In: Bojrab, M.J., ed. [Current Techniques in Small Animal Surgery](#), 4th Ed. Baltimore: Williams & Wilkins 1998: 1168 - 1170.