



RESTORATION PRUNING: ROOTS, STEMS, and BRANCHES

SEVERING SUBTERRANEAN STRANGLERS

(for full article see page 8 here: http://www.tcia.org/PDFs/TCI_MAG_July_07.pdf)

Why is there a trunk flare on one side of the tree, but not the other? Why has the tree trunk developed an unnatural lean, or signs of fungal and bacterial disease? Why is the crown imbalanced, with most of the branches growing in one direction? Stem-girdling roots are the cause of many urban tree problems today, but they are often suspected only after the tree declines and other suspects are eliminated.

Every arborist and urban forester should be able to examine root crowns and restore defective root systems by severing these sinister subterranean stranglers. The first part of this presentation proposes a protocol for the process of pruning problem roots.

Check the Crown and Trunk

Leaning stems and imbalanced branching patterns can indicate stem-girdling roots. The problematic parts of the upper tree are often on the same side as the problems down below. An inward curve to the trunk where there should be an outward flare is a strong indicator that roots are squeezing the stem. Every tree in the landscape should have a visible trunk flare.

Tap and Trace

Resonance testing with a rubber mallet can yield a hollow sound, indicating a pocket of air and the need for a closer inspection. On older trees with thick bark plates some air pockets are normal. Scrape away the dead bark above the SGR until you reach moist and bright-colored tissue, indicating living cells. Then stop! Where the inner bark is brown and dry it is dead, so pull it off. If there is resistance, bend or cut the dead bark to avoid pulling off living bark. Always avoid wounding stem tissue.

Remove Mulch and Soil from Stem Remove—blow, wash, dig, scrape, brush or pick the soil away from the stem. Remove soil containing no significant roots away from the stem, out to and including the watering berm. Cut the small roots growing upward or inward near the stem out of the way. If roots are found growing out of the stem above the flare, they may be forming a secondary support system for the tree. Adventitious roots should be removed only with caution; one source suggests that if they are over ½" in diameter they may be better left connected.

When stem-girdling woody roots are exposed, straighten them away from the trunk and bury the ends near grade if possible. Otherwise, prune them carefully.

Prune the worst first, leaving as much root as possible while mitigating the defect. Tools ranging from a well-balanced chainsaw to a short, straight-bladed handsaw to loppers to hand pruners to small chisels should be available so the work can be done efficiently

without damaging stem tissue. Make clean cuts at the origins, so regrowth does not re-girdle the trunk or buttress root. If the root is large and only girdles a small portion of the stem, it may be best to leave it alone. On roots that are overgrown by stem tissue, make several cuts and gently wiggle the root loose. If it does not move, sever both ends and chisel off as much of it as possible so it will be pushed off as the trunk and buttress roots expand. The 20-30% guideline for branch pruning may also apply to root pruning.

An ounce of prevention in the nursery, or four ounces of inspection at buying time, or eight ounces of correction at planting time can prevent a ton of work, but in the end it's up to the arborist to find the flare and fix the roots. It may be hard, dirty work, but the results are obvious over time, and make for happy clients. Good roots grow good trees, and good tree care grows good roots, so it's time to stop discussing and start practicing.

Pruning Damaged Bark and Lightning-Struck Tree Restoration

(for full article see page 8 here: http://www.tcia.org/PDFs/TCI_MAG_June_07.pdf)

When lightning strikes a tree, the owner will often assign an arborist to help determine the appropriate response. Depending on the tree and on the arborist, what they hear is often "It's going to die, so we should remove it", or "It looks okay for now, let's wait and see." These responses neglect tree care techniques that are useful for assessing and mitigating lightning damage:

1. Bark inspection. Tap the bark with a mallet to determine whether it is detached from the wood. Measure the detached areas. Probe any cracks in the xylem with a thin instrument to determine the depth. If the damage to the lower trunk is not extensive, inspect the crown.
2. Consider the species' relative tolerance to lightning strikes, based on its compartmentalization qualities, grain pattern, and genetic vigor.
3. Consider the individual specimen's vitality, and its location relative to people and property. Assess the risk.

Next, describe treatment options for the owner, with a prognosis of recovery if the treatments move forward. If an insurance company is involved, the arborist is often asked to make and carry out recommended treatments because the tree work is part of a claim. If the owner decides the risk is acceptable, these steps can be taken:

1. Reattach the bark if it is still moist inside. Thin bark may move enough if it is wrapped tightly for a few weeks. Thicker bark may be reattached with fasteners such as staples.
2. If the bark cannot be reattached, it should be trimmed—"traced"—back to the point where it is attached to the xylem, so there will be no hollow area formed as callus tissue grows on the detached bark. This applies to all the bark, from the top of the tree down to the buttress roots.
3. The exposed wood should be treated to repel insects. Reapply as needed.

4. The soil around the roots, especially those that carried the current, should be aerated as needed and inoculated with beneficial microorganisms such as mycorrhizal fungi. Any mineral element that is lacking should also be applied
5. Mulch the root system 2-4" with organic material, and irrigate.

Pruning Storm-Damaged Trees: Heading for Better Form

From tropical hurricanes to arctic ice storms, storms tear tree branches. These branches have stored essential resources the trees need for growth and defense. If too much branch tissue is lost, the tree dies. When pruning storm-damaged trees, the best approach is to take off as little healthy tissue as possible. The guideline for everyday pruning sometimes called the "1/3 Rule"-- pruning back to lateral branches 1/3 the size of the parent--does NOT apply to trees with heavy crown damage.

Removing damaged tissue is known as crown cleaning, which is Pruning Job #1. Branches can be cleaned back to the nodes. "A node is the position on a stem or trunk that was occupied by the terminal bud ... Pruning cuts should be made at nodes OR at crotches." (Alex Shigo) Nodes usually have compacted xylem in a branch protection zone (BPZ). Branch cracks often end where this xylem resists, making nodes natural and highly visible targets. On a large tree, a BPZ should still be in place at a barren node where a lateral branch has been shed, and suppressed buds lie dormant, ready for release.

Growth from dormant buds is not epicormic, because it does not originate outside the core of the stem or branch. This growth is connected to the core of the parent via a pith trace that is anchored by compacted xylem. (*A New Tree Biology*, p. 139) The dormant bud is nourished by a vascular connection, so the resulting shoot can grow strong and speed closure of the wound. Calling this growth "epicormic" lumps it together with weak growth from adventitious buds newly formed in the bark. This can mislead the client into fearing that the growth is somehow defective when it is not. Because the shoot originates from, and remains anatomically and physiologically connected to the inner core, it seems far more accurate to call it **endocormic** growth.

Sometimes to keep the tree you must leave stubs, and people will call you a hack, or a tree-topper, or worse. Three questions to consider:
What are worse; temporary stubs, or deeper decay, sunscald, weakness and imbalance?
How strong is the science behind the "1/3 Rule"?
Mother Nature gave this tree a big pruning dose—should we give it an overdose?

"Heading cuts can be used where a removal or reduction cut would remove too much live wood, or would result in a large trunk wound. Also, a heading cut can be appropriate on branches broken during a storm that are approximately 4 inches or less in diameter, which can be restored through sprout management. Topping reduces the *entire canopy*, whereas heading cuts used in restoration are made only when necessary.

Heading cuts are allowed in the national pruning standard {ANSI A300 Part 1 (2001) 4.20 and 5.5.3} as part of restoration, but this practice should not be mistaken with topping.

Space sprouts being left to become new branches about 12 inches apart if possible. The ones you save should have plenty of lateral branches and preferably a slight swelling or buttress where it meets the broken branch. *Remove* one-third of the others and *reduce* one-third of the others to allow the saved ones to develop lateral branches and good taper. This prevents all the sprouts from growing too long and becoming weak. The reduced sprouts do not have to be spaced 12 inches apart, as they will eventually be removed. Patience is needed for this process. Removing too much in one pruning visit will weaken the wood. The reduced sprouts are necessary for strengthening the wood and building strong attachments.” (University of Florida’s *Urban Forest Hurricane Recovery Program*, <http://treesandhurricanes.ifas.ufl.edu>) For more information on preventive and restorative pruning, visit Ed Gilman’s website at <http://hort.ifas.ufl.edu/woody> or refer to his *Illustrated Guide to Pruning*.

Can tree loss and repair be claimed on insurance and taxes? Casualty is contingent on causality. If an event is sudden and unexpected, that may help establish that a loss is a casualty. Consulting with an accountant can convince a client to claim tree loss as a capital loss. Even if the claim is not made, the cost of the appraisal may be deducted on the client’s Schedule A. Can it hurt to ask? Bear in mind that the Trunk Formula Method was disallowed by an IRS court after Hurricane Andrew in 1992. Cost of Cure and Cost of Repair Methods may hold up better when taxes are involved. An appraisal may affect the decision of whether to restore or remove the tree, and so can the determination by field personnel that damage to a structure or other insured item was done by a part from a tree that can subsequently be restored or repaired.

Years after heading cuts are made, thinning cuts must be made to restore the tree’s shape. Simply remove or reduce the sprouts that don’t seem to have a future. Try not to take off more than 30-40% of them at a time. White and willow oaks in North Carolina, *Quercus alba* and *phellos*, damaged by ice in 2002, just got their first crown thinning. It seems that these mature trees can be pruned on a 5-year cycle, which makes crown restoration economically feasible for many owners. The trees can grow balanced and strong, able to stand up to the next big storm. Someday, people may not be able to tell the trees were ever damaged at all.

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