

Evidence Review

The Guideline for Pneumatic Tourniquet Safety was approved by the AORN Guidelines Advisory Board and became effective as of May 11, 2020.

A medical librarian with a perioperative background conducted a systematic search of the databases Ovid MEDLINE®, Ovid Embase®, EBSCO CINAHL®, and the Cochrane Database of Systematic Reviews. The search was limited to literature published in English from **January 2012 through February 2019**. At the time of the initial search, weekly alerts were created on the topics included in that search. Results from these alerts were provided to the lead author until **September 2019**. The lead author requested additional articles that either did not fit the original search criteria or were discovered during the evidence appraisal process. The lead author and the medical librarian also identified relevant guidelines from government agencies, professional organizations, and standards-setting bodies.

Search terms included *acido**, *acute capillary rupture syndrome*, *adductor canal block*, *adjustment pressure*, *ankle block*, *arm injur**, *arterial occlusion pressure determination*, *arterial occlusion pressure estimation*, *arterial tourniquet*, *arthroplasty*, *avascular necrosis*, *Bier block*, *blood pressure*, *bloodless field*, *bloodless surgery*, *brachial plexus neuropath**, *calcifications*, *carbon dioxide*, *cardiac output*, *chemoprophylaxis*, *compartment syndromes*, *competencies*, *compression injur**, *conduction an*esthesia*, *conscious sedation*, *cuff injur**, *cuff pain*, *damaged muscle tissue*, *digital block*, *disease transmission (infectious)*, *distal tourniquet*, *DVT*, *elastic band*, *elastic bandages*, *elastic tourniquet cuff*, *elective surgical procedures*, *Esmarch bandage*, *exsanguinat**, *extremities*, *extremity girth*, *fat embolism syndrome*, *foot injur**, *functional outcomes*, *gauze bandage*, *hand injur**, *hemodynamic effects*, *hemostasis (surgical)*, *hidden blood loss*, *hyperemia*, *hypox**, *iatrogenic fracture*, *inflation pressure*, *interface pressure*, *intertourniquet distances*, *intracranial pressure*, *intravenous regional an*esthesia*, *ischemi**, *latex allergy*, *leg injur**, *limb circumference*, *limb elevation*, *limb occlusion pressure determination*, *limb occlusion pressure estimation*, *limb surgery*, *local inflammation*, *lower extremity*, *maintain pressure*, *metabolic changes*, *metabolic effects*, *metabolic events*, *metabolic phenomena*, *microbial colonization of tourniquet*, *microvascular function*, *minimizing cuff pressure*, *muscle atrophy*, *musculoskeletal injur**, *nerve injur**, *nerve palsy*, *neuromuscular injur**, *Northwick Park*, *nursing assessment*, *nursing care*, *nylon cuff*, *occlusion of vasculature*, *occlusion protocols*, *orthopedics*, *osteogenesis imperfecta*, *oxidative stress*, *oxygen consumption*, *pain measurement*, *paired tourniquet*, *paradoxical blood loss*, *paresthesia*, *patient comfort*, *patient experience*, *patient pain perception*, *patient positioning*, *patient preference*, *patient reported outcomes*, *patient satisfaction*, *performance metrics*, *perioperative assessment*, *perioperative care*, *peripheral block*, *peripheral nervous system diseases*, *phalange surgery*, *pneumatic tourniquet*, *postocclusive reactive hyperemia*, *postoperative anemia*, *postoperative complications*, *postoperative knee swelling*, *postoperative recovery*, *proximal tourniquet*, *pulmonary embolism*, *pulse*, *pulse oximetry monitoring*, *radial neuropath**, *regulate pressure*, *reinflation*, *reperfusion injur**, *respiration*, *rhabdomyolysis*, *Rhys Davies*, *routine practice*, *Rumpel-Leede phenomenon*, *sickle cell*, *silicon ring*, *simulated use of tourniquets*, *simulated training*, *skin integrity*, *skin lesions*, *soft tissue injur**, *squeeze method*, *surgery (elective)*, *surgery (operative)*, *surgical hemostasis*, *surgical procedures (operative)*, *systemic inflammation*, *systemic inflammatory response*, *thromboembolic events*, *tissue oxygen saturation*, *tourniquet*, *tourniquet width*, *tourniquet failure*, *tourniquet hypertension*, *tourniquet inflation*, *tourniquet injur**, *tourniquet pain*, *tourniquet release timing*, *tourniquet time*, *tourniquet tolerance*, *tourniquet width*, *tourniquets*, *tumescent local an*esthesia infiltration*, *two tourniquet sequential block*, *ulnar neuropath**, *upper extremity*, *vascular injur**, *venous congestion*, *venous occlusion technique*, *venous reflux*, *vital signs*, and *wide tourniquet cuff*.

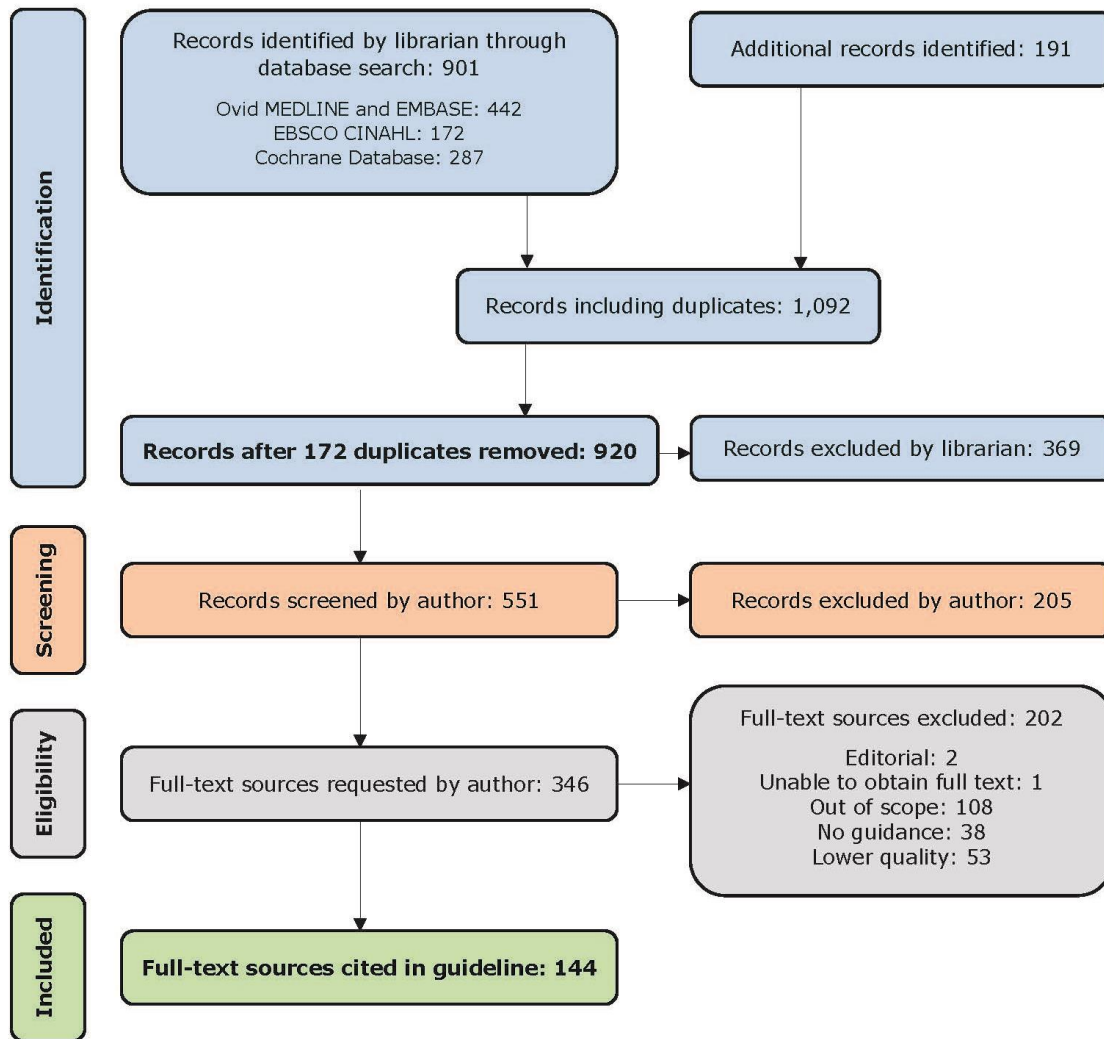
Included were research and non-research literature in English, complete publications, and publications with dates within the time restriction when available. Historical studies were also included. Excluded were non-peer-reviewed publications and older evidence within the time restriction when more recent evidence was available. Editorials, news items, and other brief items were excluded. Low-quality evidence was excluded when higher-quality evidence was available, and literature outside the time restriction was excluded when literature within the time restriction was available. Studies that evaluated exsanguination without the use of a pneumatic tourniquet were excluded (**Figure 1**).

Articles identified in the search were provided to the project team for evaluation. The team consisted of the lead author and one evidence appraiser. The lead author and the evidence appraiser reviewed and critically appraised each article using the AORN Research or Non-Research Evidence Appraisal Tools as appropriate. A second appraiser was consulted in the event of a disagreement between the lead author and the primary evidence appraiser. The literature was

independently evaluated and appraised according to the strength and quality of the evidence. Each article was then assigned an appraisal score. The appraisal score is noted in brackets after each reference as applicable.

Each recommendation rating is based on a synthesis of the collective evidence, a benefit-harm assessment, and consideration of resource use. The strength of the recommendation was determined using the AORN Evidence Rating Model and the quality and consistency of the evidence supporting a recommendation. The recommendation strength rating is noted in brackets after each recommendation.

Figure 1: PRISMA 2009 Flow Diagram



Adapted from Moher D, Liberati A, Tetzlaff J, Atman DG; The PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. PLoS Med 2009;6(6):e1000097.

Publication History

- Originally published April 1984, *AORN Journal*. Revised November 1990.
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- Revised November 2001; published February 2002, *AORN Journal*.
- Revised 2006; published in *Standards, Recommended Practices, and Guidelines*, 2007 edition.
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- Revised April 2013 for online publication in *Perioperative Standards and Recommended Practices*.
- Evidence ratings revised 2013 to conform to the AORN Evidence Rating Model.
- Minor editing revisions made in November 2014 for publication in *Guidelines for Perioperative Practice*, 2015 edition.
- Evidence ratings revised in *Guidelines for Perioperative Practice*, 2018 edition, to conform to the current AORN Evidence Rating Model.
- Evidence ratings revised and minor editorial changes made to conform to the current AORN Evidence Rating model, May 2019, for publication in *Guidelines for Perioperative Practice* online.
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