

## The Tubing, Hitch and Lasso, Intussusception Anchor (THALIA) Technique: A Novel Approach to Fixate the Penile Implant Reservoir



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### ABSTRACT

**Background:** Penile implant reservoir herniation or migration after inflatable penile prosthesis (IPP) placement may occur with standard or submuscular placement. Additionally, fixating the tubing in patients with retained reservoirs may be helpful for future prosthetic surgeons.

**Aim:** We describe a novel technique to fixate IPP reservoirs in the preferred position.

**Methods:** We present our preferred technique to fixate IPP reservoirs to prevent migration or herniation.

**Outcomes:** We evaluated our success in preventing reservoir herniation or migration.

**Results:** 35 cases successfully underwent our new technique. 30 cases involved reservoirs that were thought to be at a high risk for migration. 5 cases were performed in non-infected retained reservoir scenarios where a reasonable attempt at removal either failed or was considered high risk. No immediate reservoir or infectious complications occurred. Mean follow-up was 5 months. The technique extended the case time by 5–10 minutes.

**Conclusion:** Our novel technique is feasible, and although further follow-up and power are needed, fixating the pump tubing may reduce reservoir complications. **Yang D, Heslop D, Houlihan M, et al. The Tubing, Hitch and Lasso, Intussusception Anchor (THALIA) Technique: A Novel Approach to Fixate the Penile Implant Reservoir. J Sex Med 2021;18:224–229.**

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**Key Words:** Penile Prosthesis; Reservoir Complications; Reservoir Herniation; Surgical Technique; Drain and Retain

### BACKGROUND

Reservoir complications with 3-piece inflatable penile prosthesis (IPP) are rare.<sup>1</sup> Reservoir herniation or migration has historically been reported in 0.09–1.34% of patients.<sup>1–5</sup> However, with the increase in use of high submuscular reservoir placement, reservoir herniation or migration may become more common.<sup>2</sup> Reservoir herniation typically occurs in the immediate postoperative setting following vigorous coughing or Valsalva in the setting of a capacious inguinal ring. Penoscrotal approach and high submuscular placement have been suggested to have an increased risk of herniation.<sup>2,5</sup> As such, several high-volume implanters have recommended techniques to help avoid this complication.<sup>2</sup>

Furthermore, urologists are increasingly aware of the potential catastrophic complications associated with reservoir placement or

removal (ie, vascular injury, bladder injury, bowel injury etc).<sup>6</sup> As such, in patients without obvious infection, leaving a defunctionalized reservoir or “drain and retain” has been shown to be a safe alternative.<sup>7</sup> Similarly pressure regulating balloons (PRB) from artificial urinary sphincters can be left in situ.<sup>8</sup> Occasionally, retained reservoirs can lead to serious complications such as infection, migration, and erosion into adjacent structures or inflammatory reactions.<sup>9</sup> Some of these complications likely occur as a result of the IPP reservoir or artificial urinary sphincter PRB residing within the peritoneum where a capsule does not form around this part of the device. A cadaver study revealed that this may be more common than previously thought.<sup>10</sup> In these instances, securing retained components in place may prevent device migration and provide a reliable location to identify the tubing for any subsequent surgeon in the rare instance of infection.

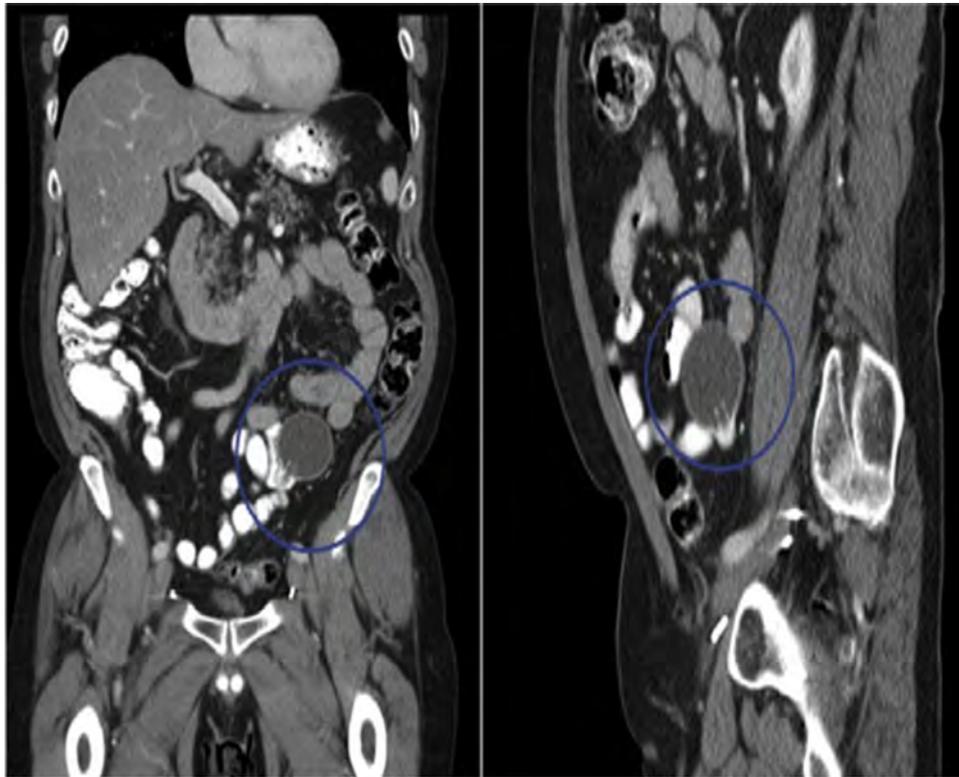
Herein, we describe the Tubing, Hitch And Lasso, Intussusception Anchor (THALIA) technique for securing the tubing and reservoir. We assert that this technique is applicable in 3 different scenarios: (i) when the surgeon has concern that the reservoir may migrate downward after the

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**Figure 1.** Intraperitoneal reservoir. Figure 1 is available in color online at [www.jsm.jsexmed.org](http://www.jsm.jsexmed.org).

new placement of a reservoir in a submuscular location, (ii) when the surgeon has concern that a new reservoir may herniate out of the space of Retzius, and (iii) when the surgeon is utilizing a drain and retain technique to leave behind a defunctionalized implant reservoir (or artificial sphincter PRB) to prevent migration to a new location. We also describe our 2 additional steps to drain, retain, cap, and entrap (DRCE) a defunctionalized reservoir or PRB.

## INDICATIONS FOR PROCEDURE

The surgeon may have concerns that a newly placed penile implant reservoir may migrate in the space of Retzius or submuscular location. For reservoir placement in the space of Retzius, the surgeon may palpate the external ring and lift it with a Deaver retractor to facilitate piercing of the transversalis fascia.<sup>11</sup> Regardless of the technique to perforate the fascia, the defect may be noted to be excessively large with a large portion of the reservoir easily visualized or palpated through the inguinal ring. Risk of device herniation may also be increased with smaller reservoir fill volumes, when the device is left in a fully inflated position, or in patients at a higher risk of coughing or vomiting post-procedurally. For submuscular placement, an instrument is passed through the external ring, piercing the inguinal canal, to reach the space between the transversalis fascia and the rectus abdominis muscle.<sup>12</sup> Difficulty in establishing a good plane

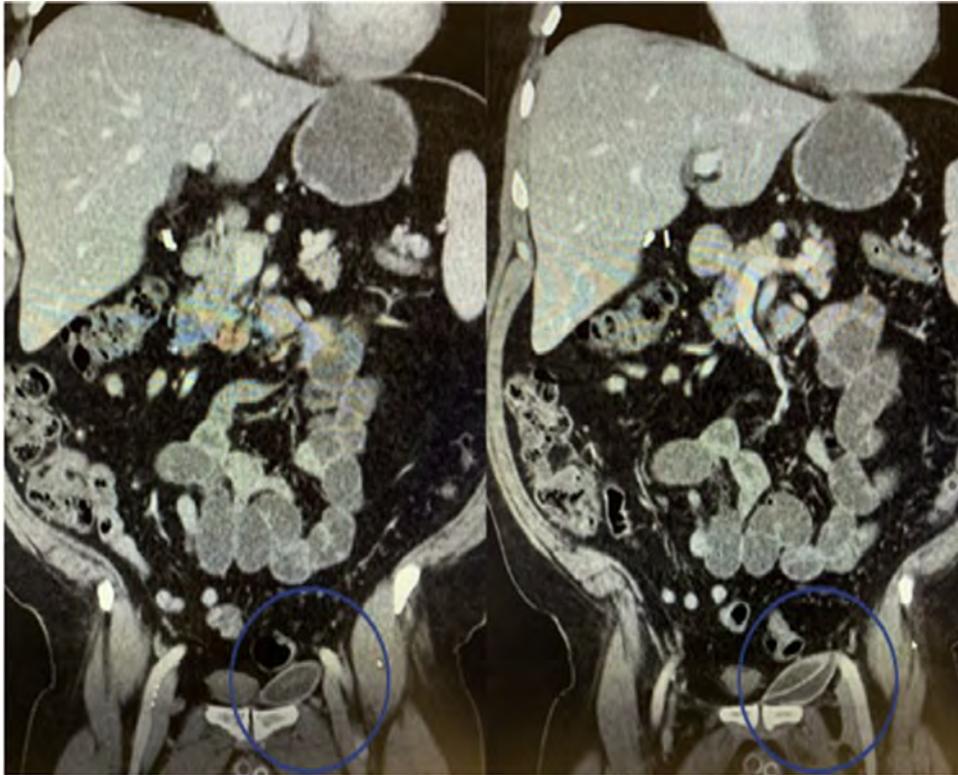
immediately above the fascia but below the muscle can cause concern for downward migration. Excessive Valsalva, smaller reservoir fill volumes, or vigorous activity also may increase downward migration risk.

We also utilized our technique in all patients who had their reservoir left in situ after reasonable attempts to remove it failed. Securing the reservoir tubing allows a reliable location to identify the tubing in case of future intervention and attempts to prevent reservoir migration.

## PREOPERATIVE PREPARATION

In the setting of IPP placement, reviewing the patient's prior surgical history for prior hernia repair or violation of the pre-vesical space is important in assessing the difficulty and location for planned reservoir placement (Figure 1).

During device explanation or revision, reviewing the original operative report is important to know the location of the reservoir and if there was any difficulty with initial reservoir placement. Most importantly, we recommend cross-sectional imaging to determine the exact reservoir location and its proximity to any of the vital structures (Figure 2). In patients with reservoirs close to the colon, iliac vessels, or bladder, a greater act of valor may be to leave the reservoir in situ rather than risk injury.<sup>6</sup> Patients should be counseled ahead of time



**Figure 2.** Reservoir wedged between iliac artery and vein. Figure 2 is available in color online at [www.jsm.jsexmed.org](http://www.jsm.jsexmed.org).

about the possibility and the chart well documented of any retained materials.

## INTRAOPERATIVE CONSIDERATIONS

### THALIA Stitch for New Reservoirs

After placement of the reservoir, if the external ring is capacious or there is concern for reservoir herniation or migration, the THALIA stitch can be utilized. Prior to connecting the reservoir and pump tubing, a 2-0 Ethibond on a Circle Taper (CT-1) needle is used to take a generous bite of tissue over the pubic bone and left untied (Hitch). One end of the stitch is threaded through an extra tubing collar (Lasso). The newly placed reservoir tubing is threaded through the above collar so the tubing and Ethibond are adjacent and both go through it. Next the Ethibond is tied down affixing it to the pubic bone (Anchored). Now the reservoir cannot migrate downward into the scrotum as the lock out valve will stop at the collar (Intussusception) (Figure 3).

If concern for new reservoir herniation still exists, the surgeon may also consider overfilling the reservoir to prevent herniation even when the IPP is fully inflated. However, excess fluid in the reservoir may increase compression of pelvic structures and create a more noticeable bulge for reservoirs outside the space of

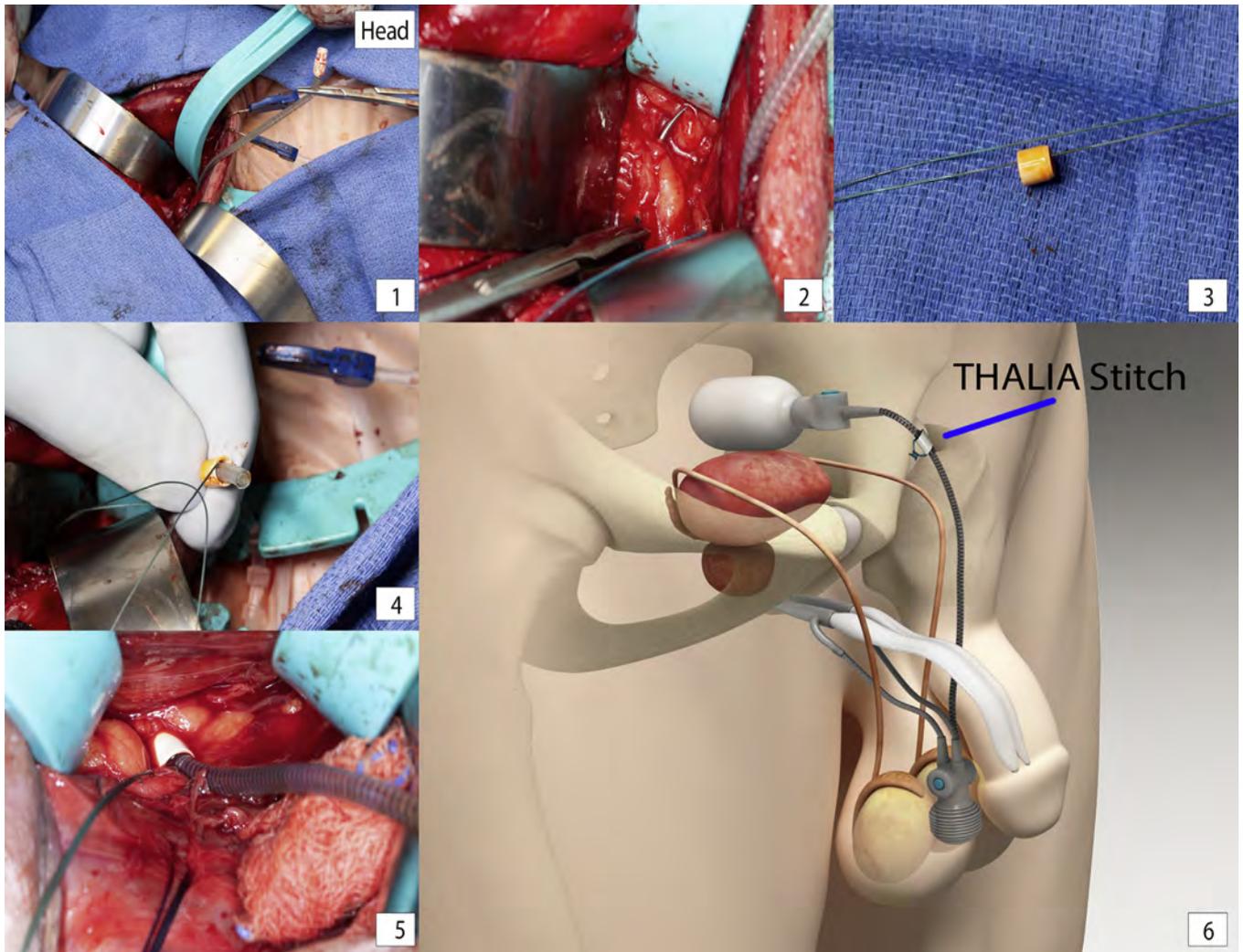
Retzius. The THALIA stitch adds 5–10 minutes to the operative time.

### THALIA Stitch for Retained Reservoirs: DRCE

When the reservoir is in a hostile location or reasonable attempts to remove reservoirs fail, the previously described drain and retain technique has been demonstrated to be effective. We added a few additional steps to try to enhance this maneuver's safety. As mentioned earlier, a 2-0 Ethibond is secured to the tissue overlying the pubic bone and passed through an additional connector. The connector is placed on the reservoir tubing. The tubing is then capped after the reservoir is emptied (to prevent accumulation of fluids as a nidus for infection) and the stitch is tied down to entrap the reservoir. This technique is likely most useful for reservoirs or PRBs that are intraperitoneal where capsules do not form. The reservoir is also easier to retrieve later if necessary, given the capped tubing's fixed location (Figure 4).

## POSTOPERATIVE MANAGEMENT AND FOLLOW-UP

In the immediate postoperative setting, aggressive treatment of nausea and coordination with anesthesia specialists to prevent



**Figure 3.** THALIA technique to prevent downward reservoir migration for capacious fascial defect. 1. Exposure of tubing and left pubic tubercle with spermatic cord retracted medially. 2. Hitch bite of tissue overlying pubic tubercle (2-0 Ethibond). 3. Lasso free connector with one end of Ethibond stitch. 4. Put collar over reservoir tubing before connecting to pump tubing to allow intussusception of collar and reservoir. 5. Tie down Ethibond to anchor reservoir. The reservoir is now ready to be connected to the pump tubing. 6. Diagram of expected THALIA stitch. THALIA, Tubing, Hitch And Lasso, Intussusception Anchor.

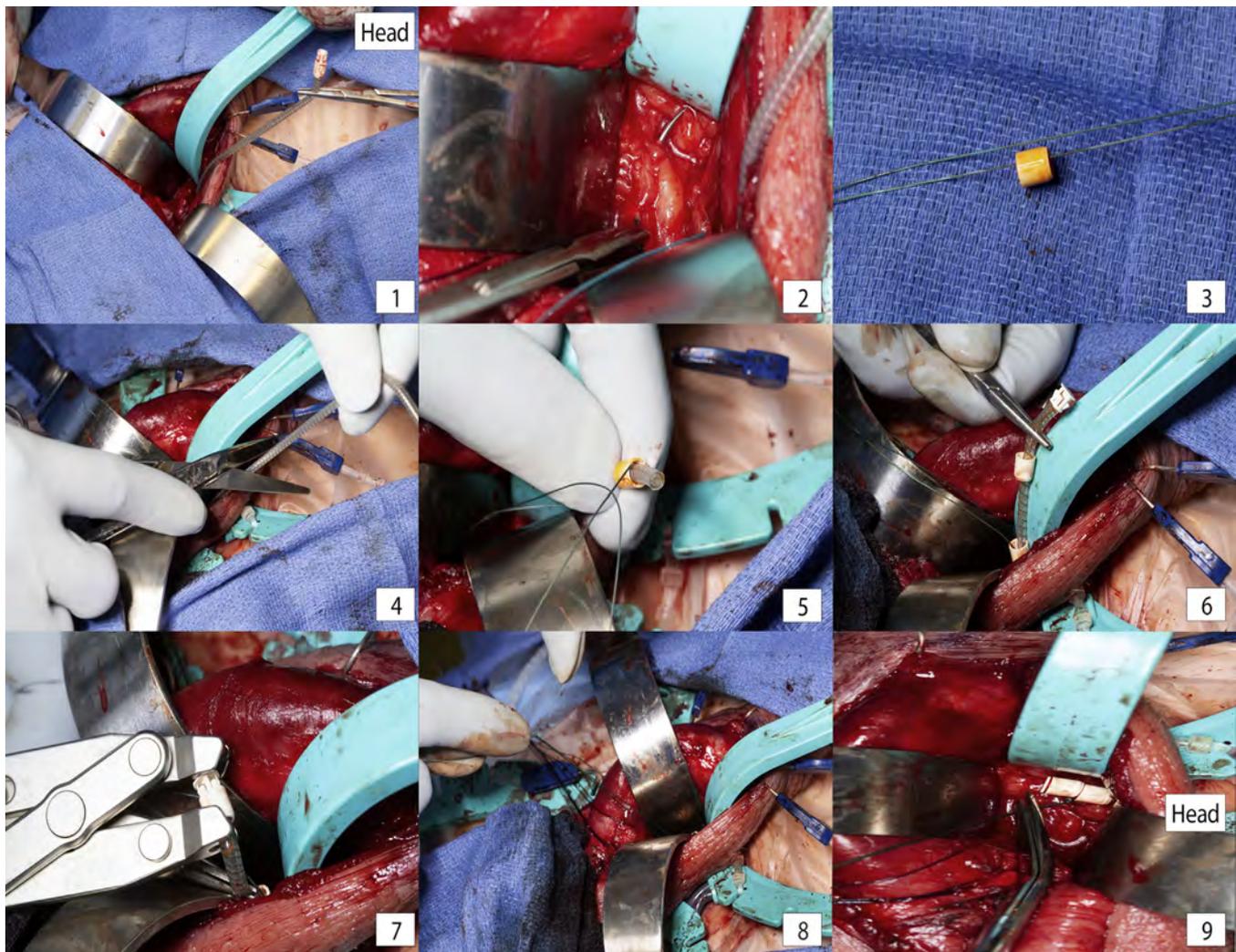
vigorous coughing or Valsalva with extubation may prevent herniation.<sup>5</sup> Otherwise, no change to postoperative management or follow-up is necessary.

### OUTCOMES AND COMPLICATIONS

We utilized this technique in 35 patients undergoing IPP placement or revision. 30 cases involved reservoirs that were thought to be at a high risk for migration. Of these 19 were submuscular (we placed all post-robotic prostatectomy reservoirs in a submuscular location) and 11 were space of Retzius reservoirs that were deemed to be at high risk of herniation. 5 cases

were performed in non-infected retained reservoir scenarios where a reasonable attempt at removal either failed or was considered high risk. 2 cases used a bilateral THALIA stitch with a DRCE on one side and then a new reservoir fixation stitch on the other. No immediate reservoir or infectious complications have occurred to date. Mean follow-up was 5 months.

Although no complication was reported from this technique, there is the potential that scar tissue may develop around the additional tubing connector and Ethibond stitch that could make removal more difficult in the future. Additionally, although the Ethibond is a permanent suture that does run the risk of infection, we have not seen this in any of our patients undergoing the



**Figure 4.** Photo demonstration of THALIA technique for drain retain cap, and entrap (DRCE). 1. Exposure of tubing and left pubic tubercle with spermatic cord retracted medially. 2. Hitch bite of tissue overlying pubic tubercle (2-0 Ethibond). 3. Lasso free connector with one end of Ethibond stitch. 4. Completely drain old reservoir. Cut old tubing but do not let tubing retract away. 5. Put collar with Ethibond over old tubing remnant. 6. Place second collar and cap (prevents reservoir from filling with blood/fluid and brewing infection). 7. Crimp plug. 8. Tie down Ethibond. 9. Finished product with old reservoir now unable to migrate. THALIA, Tubing, Hitch And Lasso, Intussusception Anchor.

THALIA technique or those undergoing dorsal phalloplasty utilizing Ethibond suture.

## CONCLUSIONS

The THALIA stitch or DRCE are quick maneuvers using minimal additional operative time or resources to provide added security against reservoir herniation or migration.

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## STATEMENT OF AUTHORSHIP

David Yang: Conceptualization, Methodology, Investigation, Data Curation, Writing - Original Draft, Visualization; Daniel Heslop: Conceptualization, Methodology, Investigation, Data Curation, Writing - Original Draft; Matt Houlihan: Conceptualization, Methodology, Investigation, Writing - Review and Editing, Supervision; Sevan Helo: Investigation, Resources, Writing - Review and Editing, Supervision, Funding Acquisition; Matt Ziegelmann: Investigation, Resources, Writing - Review and Editing, Visualization, Supervision, Funding Acquisition; Tobias S. Köhler: Conceptualization, Methodology, Investigation, Resources, Data Curation, Writing - Original Draft, Writing - Review and Editing, Visualization, Supervision, Funding Acquisition.

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