Peer reviewed article

Does successful treatment of constipation or faecal impaction resolve lower urinary tract symptoms? A structured review of the literature

Abstract

Consensus guidelines advocate the treatment of constipation and faecal impaction in order to improve symptoms of urinary frequency, urgency and urinary incontinence and to promote bladder emptying in the absence of urinary tract obstruction. This structured review of the literature was undertaken to search for and appraise evidence to support or negate the hypothesis of this relationship. The search strategy was comprehensive and identified six relevant studies. Two of these had been conducted on an adult population and four studies involved children with constipation. These studies were appraised for methodological quality. It was found that sample sizes were small and evidence was inconsistent. Variable methods of reporting meant that data were not able to be pooled for meta-analysis. Based on the limited and conflicting evidence, it is recommended that further research be undertaken to identify any correlation between bowel and bladder function.

Key words: Constipation, urinary incontinence, lower urinary tract symptoms, faecal impaction, stool impaction, functional constipation, quality of life.

Introduction

Over the past two decades, epidemiological surveys have been undertaken on the prevalence of urinary incontinence (UI) and other lower urinary tract symptoms (LUTS) in various populations. Epidemiological data is also available on the prevalence of constipation and faecal impaction in different groups of people and settings. There is a growing body of epidemiological data that identifies constipation or faecal impaction as risk factors for UI and for other LUTS. Similarly, expert consensus guidelines for the assessment and management of UI in both children and adults promote the treatment of underlying constipation or faecal impaction, identifying both as possible contributing factors to the symptoms of UI, urinary urgency, frequency and incomplete bladder emptying.

The proposition that either constipation or faecal impaction may give rise to UI or other LUTS is not without precedent. Some researchers have noted the close anatomical relationship between the bowel and the bladder, the common innervation of the pelvic floor structures and shared susceptibility to damage from childbirth, chronic staining at stool and hormonal changes associated with the menopause. Norton advises that rectal loading may form a physical outflow obstruction to urine by pressing on the bladder, urethra and local nerves, leading to urinary retention with overflow of urine and that direct pressure will also aggravate an unstable bladder thereby causing or exacerbating symptoms of urge incontinence. Rectal loading is also believed to lead to stress UI by stretching the pelvic floor and inhibiting pelvic floor contractions.
Implicit in the assumption that constipation or faecal impaction are risk factors for UI and other LUTS, is that successful treatment of these conditions will resolve or reduce these symptoms. This literature review was undertaken to identify and appraise evidence that tested this hypothesis.

Review methods

Search strategy
The method employed to identify evidence on this topic, involved a comprehensive search of the electronic interface EBSCO which provides access to a range of databases including, Medline and Cinahl. The Cochrane Database of Systematic reviews, The Cochrane Clinical Controlled Trials Register, and Database of Abstracts of Reviews of Effectiveness were also searched. Key words used in these searches were ‘urinary incontinence’ or ‘lower urinary tract symptoms’ which were combined with the words ‘constipation’, ‘faecal impaction’, ‘stool impaction’ ‘constipation’ and ‘quality of life’. The reference lists of topic-relevant publications were checked for further evidence. Full text papers were sought to assist in the selection process. Both published and unpublished data sources were checked as well as conference proceedings from relevant conferences, including the International Continence Society Annual Scientific Meetings. Data were sought from English language journals. To ensure that evidence was contemporaneous, studies were limited to those that were undertaken from 1990 onwards. The date of the most recent search of the trials register for this review was May 2005. The search and selection process was undertaken by one reviewer (JO).

Selection criteria
Evidence was included from any of the following sources:

- relevant randomised or quasi randomised controlled trials;
- relevant clinical controlled trials;
- relevant comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control analytic studies, or interrupted time series with a control group;
- relevant comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group chosen;
- relevant case series (either post-test design or pretest/post-test design)

Studies that met any of the above-mentioned design features were considered relevant if they also included all of the following conditions;

- a population that included any age groups (paediatric and adult) and in any setting;
- a population with the dual diagnoses of constipation or faecal impaction (or the simulation of these conditions) and UI and/or other LUTS and
- non-surgical treatment modalities that focused on resolving or improving constipation or faecal impaction (i.e. pharmacological and/or behavioural) and
- outcomes that focused on changes in the frequency or severity of UI and/or changes in other LUTS (i.e. bladder emptying, frequency, urgency etc) and/or changes in quality of life.

Exclusion criteria
Consistent with National Health and Medical Research Council (NH&MRC) guidelines, evidence from opinion or consensus based publications were not included. Similarly, single case studies were excluded. Studies that included individuals with urinary incontinence or other lower urinary tract symptoms that related to urinary tract obstruction or to diagnosed pathology were also excluded.

Critical appraisal
Evidence was appraised for methodological quality according to the Consolidated Standards of Reporting Trials (CONSORT) statement. This consists of a checklist and flow diagram that is applicable to the reporting requirements of a randomised controlled trial. It is based on the assumption that the avoidance of bias is best achieved by a sample size sufficient to detect differences, secure concealment of random allocation prior to formal entry, few and identifiable withdrawals and dropouts and analysis based on an intention to treat. The NH&MRC rating scale for quality of evidence was used to rate the quality of evidence from Level 1 (the highest level) to Level IV (the lowest level) (see Table 1). The quality appraisal was undertaken by one reviewer (JO).

Results
Of 254 publications identified from the search strategy, six met the inclusion criteria. Two of these were conducted on an adult population and four papers described interventions that related to a paediatric population (see Table 2). One study appeared at face-value to meet the inclusion criteria. However, on closer examination it was revealed that the participants (12 children with spina bifida) were diagnosed with functional bladder outlet obstruction. This study and others that failed to meet the inclusion criteria are noted in the table of excluded studies (see Table 3) with reasons for their exclusion.

Description of studies in adults
In a prospective cohort study involving adults, Charach and colleagues focused on the outcomes associated with alleviating constipation on a range of variables in 52 elderly people who were recruited from gastroenterology and urology clinics. Objective measures included pre- and post-transabdominal ultrasounds. A comprehensive urologic and neurologic evaluation and a colonoscopy or barium enema were performed. X-ray was also performed as part of the baseline assessment procedure. Participants were asked to complete questionnaires on bowel movements per week and other outcome measures – including mood and sexual function. The researchers reported that alleviating constipation resulted in significantly decreasing the participants’ post void residual volume from a baseline mean of 85mL +/- 39.5mL to a post-treatment volume of 30mL +/- 22.56mL (p<0.001).
Table 1: Rating scale for quality of evidence recommended by the NH&MRC.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Evidence obtained from a systematic review of all relevant randomised controlled trials.</td>
</tr>
<tr>
<td>II</td>
<td>Evidence obtained from at least one properly-designed randomised controlled trial.</td>
</tr>
<tr>
<td>III-1</td>
<td>Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).</td>
</tr>
<tr>
<td>III-2</td>
<td>Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control analytic studies, or interrupted time series with a control group.</td>
</tr>
<tr>
<td>III-3</td>
<td>Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group.</td>
</tr>
<tr>
<td>IV</td>
<td>Evidence obtained from case series, either post-test or pre-test and post-test.</td>
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</table>

Other outcomes that were reported included improvements in urinary flow, reductions in the:

- number of weekly defaecations;
- time taken up with toileting;
- incidence of symptoms of urgency and frequency;
- incidence of burning sensation during urination; and
- number of bacteriurial events.

Quality of life measures such as mood and satisfaction with sexual activity were also reported as improved following treatment.

In interpreting the results of this study, it is important to note that participants were aware of their treatment and that many of the above-mentioned outcomes were dependent on each participant’s self appraisal. Previous research has drawn attention to the potential for trial participants to either over or underestimate treatment effects when they know that they have been given a certain type of treatment. Another important consideration is the absence of an objective verification that participants did indeed have their constipation alleviated. Despite these limitations, this paper represents the largest single study involving adults in an evaluation of the impact on LUTS of treating underlying constipation.

The only other eligible study that tested the hypothesis of an association between constipation or faecal impaction and symptoms of bladder dysfunction in adults was a single blinded randomised controlled simulation trial involving a group of 23 women attending a urogynaecology clinic. The researchers reported simulating the sensation of rectal distension through the use of rectal balloon catheters. Pre- and post-urodynamic evaluations were conducted. Participant’s reported their first desire to void earlier than in the absence of a full rectum. Another finding was that their detrusor pressure was significantly increased in response to the increases in detrusor pressure generated during balloon filling. As this study was reported as a conference abstract and a full publication was not located, no further data is available.

Description of studies in children

Of the four studies that met the inclusion criteria in a paediatric population, one study reported on the long-term outcomes associated with treating ‘functional’ (non-organic) constipation on the incidence of urinary tract infection (UTI) and UI in a group of 234 children. Functional constipation was diagnosed at baseline by rectal examination and abdominal examination. Treatment consisted of education to the child and parents about good bowel habits.

At a mean of 15 months after the start of treatment, participants or parents rated the frequency and consistency of bowel movements, frequency and amount of soiling, laxative use and the presence of abdominal pain, as well as the frequency of daytime and night-time urinary incontinence in the preceding month. Based on this information, 52% of the children were reported to have had their constipation successfully treated. Eighty-nine percent of these children reportedly had no further symptoms of daytime incontinence and night-time incontinence was reported as resolved in 63%. It was also reported that all of the children who had been successfully treated for their constipation were free of recurrent urinary tract infections at re-evaluation. This study shares features with the above mentioned study, undertaken by Charach and colleagues, wherein participants were aware of their treatment and were also relied upon to provide outcome data. To this extent, the potential for bias, as previously mentioned, must be considered.

Another study to have tested the effect of treating constipation or faecal impaction on UI and other LUTS in a group of children, compared the urinary symptoms of children who had their constipation successfully treated with polyethylene glycol 3350 (n=36) with the symptoms of those children who remained constipated despite the same intervention (n=10). The researchers reported that patients in whom constipation resolved had a significantly lower post-void residual than those who remained constipated (11.8% versus 30.6%, P=0.01). These children were also reported as significantly more likely to become dry or improved than those who remained constipated (P=0.045).

In a single cohort study involving 20 children with non-neuropathic bladder-sphincter dysfunction, a subgroup of 8...
### Table 2: Table of included studies.

<table>
<thead>
<tr>
<th>Citation details</th>
<th>Design</th>
<th>Population</th>
<th>Intervention</th>
<th>Outcomes</th>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Charach</strong> a</td>
<td>Case series – pre and post test</td>
<td>52 adults (42 male, 10 female) attending gastroenterology and urology clinics – all with chronic constipation and LUTS</td>
<td>Individualised pharmacological management (i.e. benzalkonium, paraffin, Senokot, lactulose or cisapride)</td>
<td>PVR 85 vs 22 mL  Weekly defaecations 1.5 vs 1.2  Toileting time 25 vs 63 min  Urgency 16 vs 34  Frequency 25 vs 47  Burning sensation during voiding 6 vs 17  Bacteriurial events 5 vs 17  Sexual activity disturbances 18 vs 9  Mood disturbances 16 vs 6</td>
<td>IV</td>
</tr>
<tr>
<td><strong>De Paepe</strong> a</td>
<td>Case series – pre and post test</td>
<td>20 children (18 girls &amp; 2 boys) mean ages 4.4 &amp; 4.5 years – with voiding dysfunction – 8 with ‘chronic obstipation’</td>
<td>Education Positioning &amp; toilet posture Relaxation biofeedback of PFME  Positive reinforcement Anticholinergics for DI Medication for recurrent UTI’s &amp; obstipation</td>
<td>Obstipation resolved in 5/8 children urologic outcome of these individuals unclear</td>
<td>IV</td>
</tr>
<tr>
<td><strong>Erickson</strong> a</td>
<td>Case series – pre and post test</td>
<td>46 children (35 girls and 11 boys) with dysfunctional elimination</td>
<td>Polyethylene glycol 3350</td>
<td>Treatment resulted in an increase in the frequency of bowel actions. 18/46 became dry, 26/46 had reduced UI Pts with resolved constipation and a significantly lower PVR than those who remained constipated (11.8% vs 30.6%, P&lt;0.01) and were significantly more likely to become dry or improved (P=0.045)</td>
<td>IV</td>
</tr>
<tr>
<td><strong>Khullar</strong> a</td>
<td>Case series – pre and post test</td>
<td>23 women attending a urogynaecology clinic</td>
<td>Rectal distension using rectal balloons</td>
<td>Participant's first desire to void occurred earlier than in the absence of a full rectum and detrusor pressure was significantly increased in response to the increases in detrusor pressure generated during balloon filling</td>
<td>IV</td>
</tr>
<tr>
<td><strong>Lucanto</strong> a</td>
<td>Case series – post test</td>
<td>11 children aged 3-18 years who presented with chronic constipation and LUTS</td>
<td>Colonic manometry and urodynamics - preceded by a colonic clean-out followed by daily stool softeners, laxatives and enemas</td>
<td>Urinary symptoms persisted in all children despite improvement in constipation</td>
<td>IV</td>
</tr>
<tr>
<td><strong>Loening-Baucke</strong> a</td>
<td>Case series – pre and post test</td>
<td>234 children attending an outpatient encopresis clinic: 176 boys, 58 girls aged 5-18 years with functional constipation &amp; day or night UI</td>
<td>Conservative education to child and parents Disimpaction Maintenance treatment Reconditioning Withdrawal of laxatives</td>
<td>At a mean of 15 months – constipation relieved in 52%. For those with relief of constipation, daytime UI resolved in 89% &amp; night-time UI in 63%. 100% resolution of UTI in patients with no anatomic abnormality of the urinary tract</td>
<td>IV</td>
</tr>
</tbody>
</table>
### Table 3: Table of excluded studies.

<table>
<thead>
<tr>
<th>Citation details</th>
<th>Design</th>
<th>Population</th>
<th>Intervention</th>
<th>Outcomes</th>
<th>Rationale for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chase^5^</td>
<td>International multidisciplinary workshop of experts</td>
<td>40 adults with defactory and urinary disturbances – 12 with chronic constipation</td>
<td>Sacral nerve stimulation</td>
<td>Reductions in difficulty emptying the rectum &amp; in the number of unsuccessful visits to the toilet</td>
<td>Opinion paper</td>
</tr>
<tr>
<td>Ganio^5^</td>
<td>Case series – pre and post test</td>
<td>12 children mean age 7 - with spina bifida, overactive bladders &amp; detrusor sphincter dyssynergia &amp; hyperactivity of the pelvic floor musculature &amp; functional bladder outlet obstruction</td>
<td>Colonic irrigations</td>
<td>No significant changes in urodynamic characteristics obstruction</td>
<td>The outcomes were not consistent with the predefined review outcomes</td>
</tr>
<tr>
<td>De Kort^5^</td>
<td>Case series – pre and post test</td>
<td>25 adults with combined defaecation and micturition disorders</td>
<td>Rectovaginovesicopy</td>
<td>Constipation improved in 14/18 (P=0.001) &amp; dysfunctional voiding improved in 10/16 (P=0.07)</td>
<td>Surgical intervention</td>
</tr>
<tr>
<td>Silvis^5^</td>
<td>Case series – pre and post test</td>
<td>Total sample – 46 adults – 28 women and 13 men 16/46 (female) had chronic constipation, 10/16 (female) had obstructed micturition</td>
<td>Combined electromyographic proctography and cystometry</td>
<td>8/10 of the women with obstructed micturition had a protological abnormality that explained the urological symptoms</td>
<td>The outcomes were not consistent with the predefined review outcomes</td>
</tr>
<tr>
<td>Thorpe^5^</td>
<td>Diagnostic evaluation</td>
<td>Total sample – 58 women 17/58 with LUTS &amp; constipation, 13/58 with LUTS &amp; faecal incontinence</td>
<td>Anorectal manometry, balloon protomometry, measurement of anorectal angles and videouro-dynamics</td>
<td>Women with combined faecal and UI have a significantly weakened pelvic floor than those with constipation and UI</td>
<td>The outcomes were not consistent with the predefined review outcomes</td>
</tr>
</tbody>
</table>

Children was also found to have ‘chronic ‘obstipation’ (defined as a stool frequency of less than 3 x week or the presence of stool retention with or without encopresis) ^4^. The researchers reported positive urodynamic findings and urological outcomes following a multifaceted, individualised and non-invasive intervention consisting of education on proper toileting posture, relaxation biofeedback of the pelvic floor muscles (where possible), provision of education material to the child about bladder and pelvic floor function and positive reinforcement. Children with urodynamically confirmed detrusor instability also received anticholinergic medication while those with recurrent UTI or obstipation were also treated on a case-by-case basis. At outcome, obstipation was reported as alleviated in 5 of the 8 children. No conclusions can be made about the specific impact of alleviating the obstipation on UI or LUTS, however, urological outcomes were reported for the total sample and did not differentiate between individuals whose obstipation was resolved and those who did not have obstipation.

In contrast to the above evidence in support of an association between successful treatment of constipation and resolution of UI and LUTS, one study reported no association ^4^. Using a post-test case series design, the researchers examined the urodynamic patterns of 11 children with severe chronic constipation and LUTS. As a component of the pre-diagnostic procedures, the participants received a colonic lavage one day prior to the study. The test conditions were therefore based on
an empty rather than a full (constipated) rectum. The researchers reported that ‘even with improvement of constipation, 10 of 11 children were found to have abnormal urodynamic features – uninhibited bladder contractions in six, hypertonicity of the bladder in two, smaller than normal capacity bladder in one, and sphincter dyssynergy in two’46. Long-term follow-up data (mean of 4.9 years), found that constipation improved in 8 of the 11 children. Despite this, urinary symptoms reportedly persisted.

Quality appraisal
Based on NH&MRC guidelines 39, each of the included studies was classified as a case series (either with post-test evaluation data or with pre and post test evaluation data). As such, they were rated as level IV evidence. An appraisal of the quality of each of the eligible studies against the CONSORT statement was problematic in that none had employed a randomised controlled research method. With their prospective definition of methods and outcome measures, double-blind assessment of outcomes and unbiased selection of subjects and controls, randomised controlled trials are widely acknowledged as the ‘gold standard’ research method for evaluating the effectiveness of an intervention. They are not however, always appropriate in terms of the research question, nor are they always feasible or ethical. Blinding participants to a state of constipation or to its subsequent treatment presents pragmatic and ethical challenges, although it is noted that single blinding was achieved in one study45. Although this study was characterised by the absence of a control group, it could be argued that by blinding participants to when their rectal was distended and when it was empty, the researchers introduced a measure of control; a feature that is absent from other review studies.

Despite the absence of randomised non-identification of controlled trials, the CONSORT statement enabled limitations associated with the studies that met our inclusion criteria. One of these was the absence of information on whether or not power calculations were conducted to determine if sample size were sufficient to provide confidence that the results were indeed related to the intervention and were not a chance factor. The overall sample size from the 2 trials that included adults was 75 and the total sample size from the 4 trials pertaining to children was 311. Another limitation was the variable methods of evaluation and analyses employed within each study. In this context, it was not reasonable to attempt a summary estimate effect of treating constipation or faecal impaction on the predefined outcomes.

Discussion
Despite anecdotal evidence of an association between the successful treatment of constipation or faecal impaction on UI or other LUTS, empirical evidence is limited and evidence is conflicting. One of the challenges associated with evaluating outcomes associated with interventions for bowel and bladder function relates to a lack of consensus in definitions for each condition and for subsequent methods of measurement. In regard to the latter challenge, it is noteworthy that methods used to diagnose constipation were variable and ranged from self-reports to rectal examinations, X-rays and colonoscopies. Two studies described baseline assessment procedures that diagnosed the condition on the basis of clinical investigations and outcome assessment procedures that relied on participants’ self-report41, 45. Previous research has highlighted the strengths and limitations of relying on self-reporting as a method of diagnosing constipation 28, 49. Clearly, it is important to be able to comprehensively and objectively define and diagnose constipation and faecal impaction as a precursor to measuring the effectiveness of treatment.

Conclusion
In 2001, Charach and colleagues 41 drew attention to the absence of empirical research on the relationship between bowel and bladder function among older adults. This continues to be the case in 2005 despite the anecdotal data of clinicians who specialise in the care of older adults with both conditions. This finding also applied to research on the relationship between bowel and bladder function in children, albeit, to a lesser extent.

Constipation and faecal impaction are common findings in individuals with UI or other LUTS and are of concern to both hospitalised and community-dwelling individuals of all age groups. Current practice and consensus guidelines advocate the treatment of these conditions prior to more invasive procedures or investigations. Despite the lack of compelling clinical trial data, we recommend a continued clinical focus on addressing constipation and faecal impaction as possible transient causes of non-obstructive causes of urinary incontinence and other lower urinary tract symptoms. This recommendation is underpinned by the fact that conservative management directed toward alleviating constipation or faecal impaction is generally non-invasive and unlikely to result in harm. At the same time, the review findings highlight the need for further research to specifically examine the neurologic and pathophysiologic nature of the association between bowel and bladder function. If the alleviation of constipation or faecal impaction can improve or resolve UI and other LUTS, there are important implications for clinical decision-making and for the allocation of healthcare resources.

References


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