



Stool Consistency: Looking Beyond the Bristol Stool Form Scale

TO THE EDITOR: With great interest we have read the article of Chen et al¹ on the effects of *Lactobacillus casei* Shirota on stool consistency in constipated patients. Apart from an improvement of constipation-related symptoms, they also showed a clear interaction between baseline Bristol stool form scale (BSFS) consistency levels and baseline relative abundance of *Lachnospiraceae* UCG-004, *Pseudobutyrvibrio*, and *Ruminiclostridium* 5. In line with this observation, an increasing number of studies use BSFS to correct for differences in fecal consistency in microbiome analyses. The generalizability of this patient-reported tool is however unclear. The BSFS has been developed in the early 90s as a surrogate marker of whole-gut transit time (WGTT) and has been recommended for the use as such in both clinical and research settings.^{2,3} Although initially designed for WGTT, the BSFS is often used as a measure of stool consistency.

Recently, Blake et al⁴ studied the correlation between BSFS and fecal water content in 169 healthy adults and reported a high correlation ($r = 0.701$) when BSFS was assessed by trained experts. However, the correlation was only moderate ($r = 0.491$) when BSFS was self-reported, underlining the importance of inter-rater differences and experience when using the BSFS. The authors recommended that further research is required in order to assess reliability in different patient groups and to make comparisons with other methods.⁴

We suggest fecal dry weight content (ie, percentage dry weight after 4–5 hours vacuum drying 0.5 g feces at 60°C) as a more objective alternative to determine stool consistency. Excellent reproducibility of this method was found by repeating the procedure for 20 samples, showing an intraclass correlation coefficient of 0.948. We then compared patient-reported BSFS with fecal dry weight content in a pooled dataset including 122 stool samples of healthy volunteers and 67 samples of irritable bowel syndrome patients. We found a correlation of -0.411 in the total dataset, with a lower correlation in healthy subjects ($r = -0.337$) compared to irritable bowel syndrome ($r = -0.536$). Furthermore, in a subgroup of healthy elderly (70–85 years, $n = 21$) the correlation was -0.233, pointing

towards possible difficulties in rating stool consistency within specific subgroups.

In conclusion, we consider the BSFS to be a helpful tool in daily clinical practice as it is a quick and easy patient-reported measure of WGTT, and can be used as a surrogate marker for stool consistency. However, one should be aware of the relatively low correlation between the BSFS and more objective measures of stool consistency, and the considerable inter-rater error when using the BSFS. Therefore, when analyzing stool consistency in scientific studies, we suggest considering more objective assessments such as fecal dry weight or water content.

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